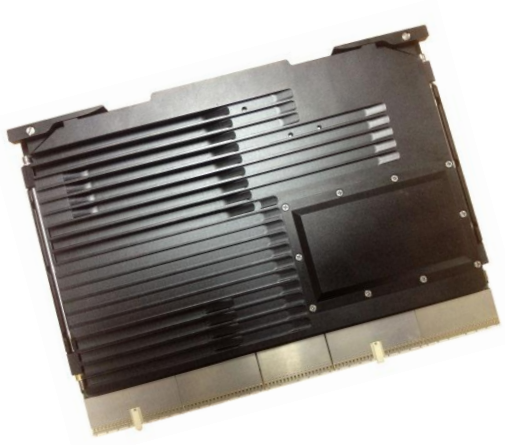
CP62101

6U Compact PCI 2nd Generation Intel Core i7 Processor Board

USER MANUAL

REV1.2

Air Cooled version



Conduction Cooled version

LinkedHope Intelligent Technologies Co., Ltd

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CHAPTER 0

WARNING

Thank you for choosing LinkedHope's CP62101 processor board, the relevant safety precautions for this product are described as below. The operator and all staff who may be involved in the operation must be fully aware of the contents of this manual to ensure the safety of persons and device.

I Description of safety signs

Safety signs involved in the device means as following:

Prohibitions：

No smoking

Smoking is prohibited while the device is working

No burning

Burning is prohibited while the device is working

Ensure fire safety facilities / equipment in good condition

No demolition

Warnings

Warning danger

Warning electric shock

II Basic safety precautions

1) The operator should go through the system operation training, and Maintenance personnel should go through the system maintenance training
2) The device must be powered on and powered off according to the procedure set forth herein

III Other safety precautions

- It is recommended to use anti-static gloves to prevent electrostatic damage, when plug and unplug the device.
- The device needs to be put into static bag when it was transported in single board or was stored
- When transporting the device, the package should be fitted with shock-absorbing protective measures to prevent extrusion, collision or damage during the transport process.
- When the device needs to be stored , you should pay attention to ventilation, damp proof, dust proof, not stored together with corrosive substances

IV The operation procedures

- The hardware configuration should be in accordance with the instructions jumper 3.2 and the user's needs; check the device connected to the board to make sure the connection is correct, particularly check if the output voltage(+12V, +5V,+3.3V) of power supply equipment meets the requirements or not.

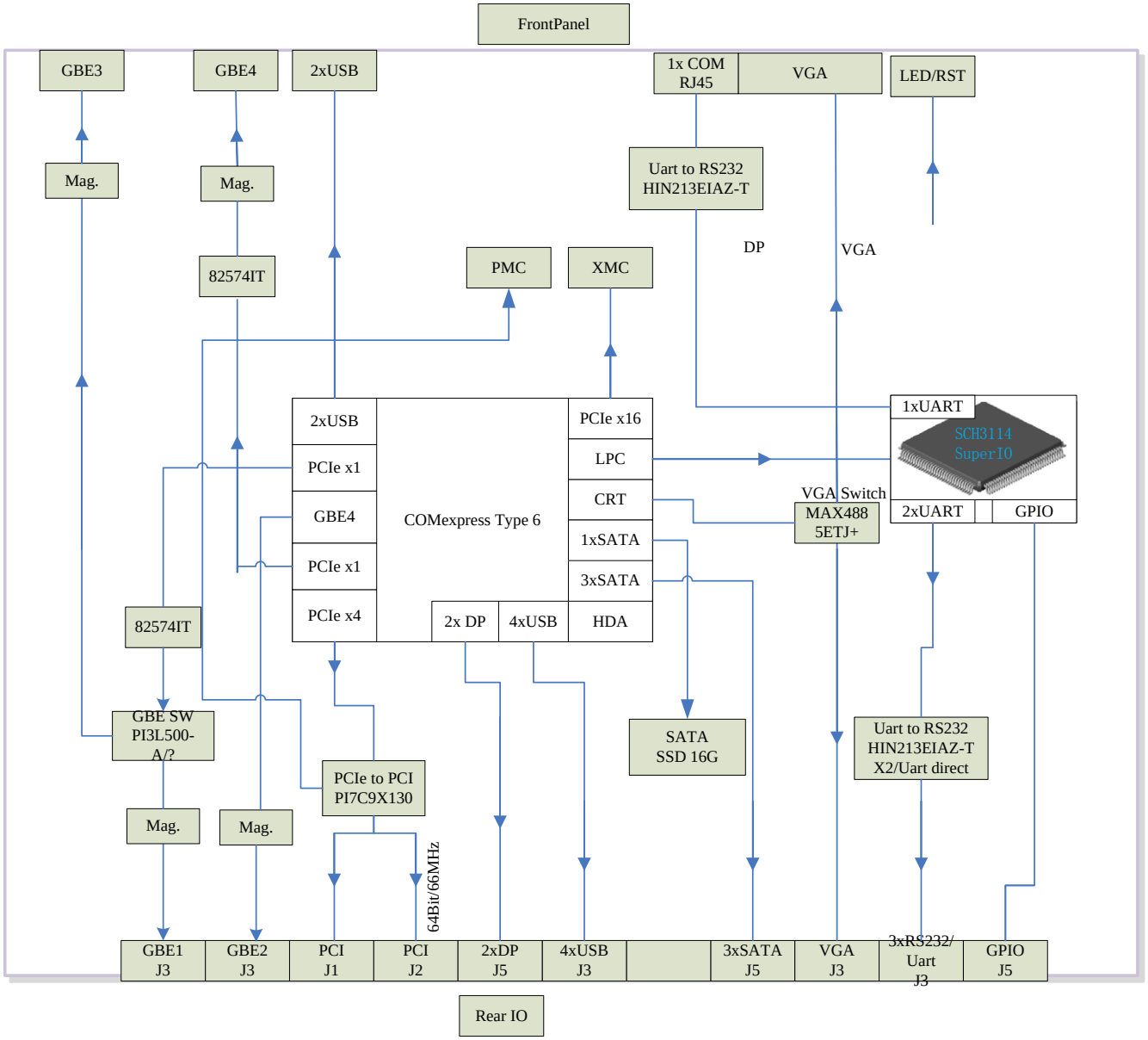
CHAPTER 1

1. INTRODUCTION

1.1 General

CP62101 is a 6U CPCI processor board base on Intel QM67/HM65 chipset and Intel® Core™ 2nd generation i3/i5/i7 processors. Frequency up to 2.5 GHz, integrated core graphics HD3000, the double channel SO - DIMM memory, maximum support with ECC (optional) 16 GB DDR3 memory, (1333/1066/800).16GB on board SSD is designed with SATA 3.0 interface for data safety and quick storage. PCI bus bit type and bandwidth are all optional from 32bit/64bit and 33MHz/66MHz. CP62101 reserved all kinds of interfaces, such as SATAII, SATAIII, USB2.0, USB3.0, Ethernet. CP62101 supports Dual-head, Multi-head display output, including VGA, DVI and HDMI. Maximum CRT output resolution is designed as 2048x1536. This processor board is powerful steady and especially suitable for the calculation of all kinds of compatible IPC and computer processing center for hush environment.

1.2 Block Diagram



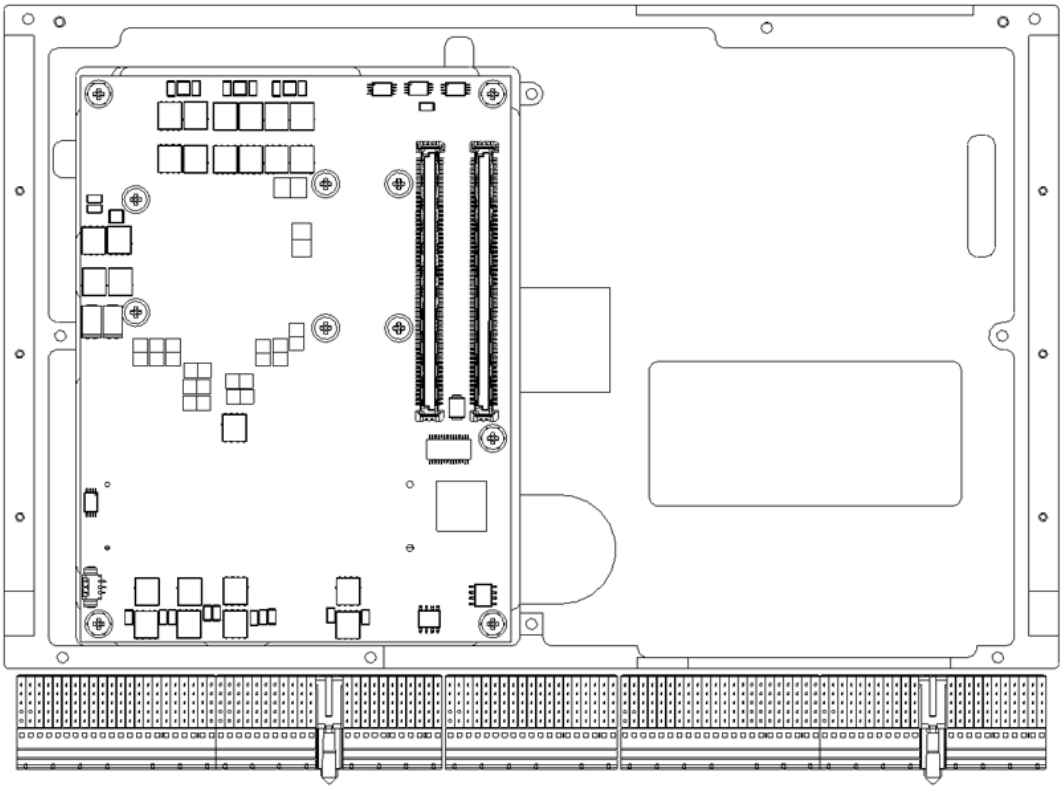
CHAPTER 2

2. HARDWARE INSTALLATION

2.1 Conduction Cooled

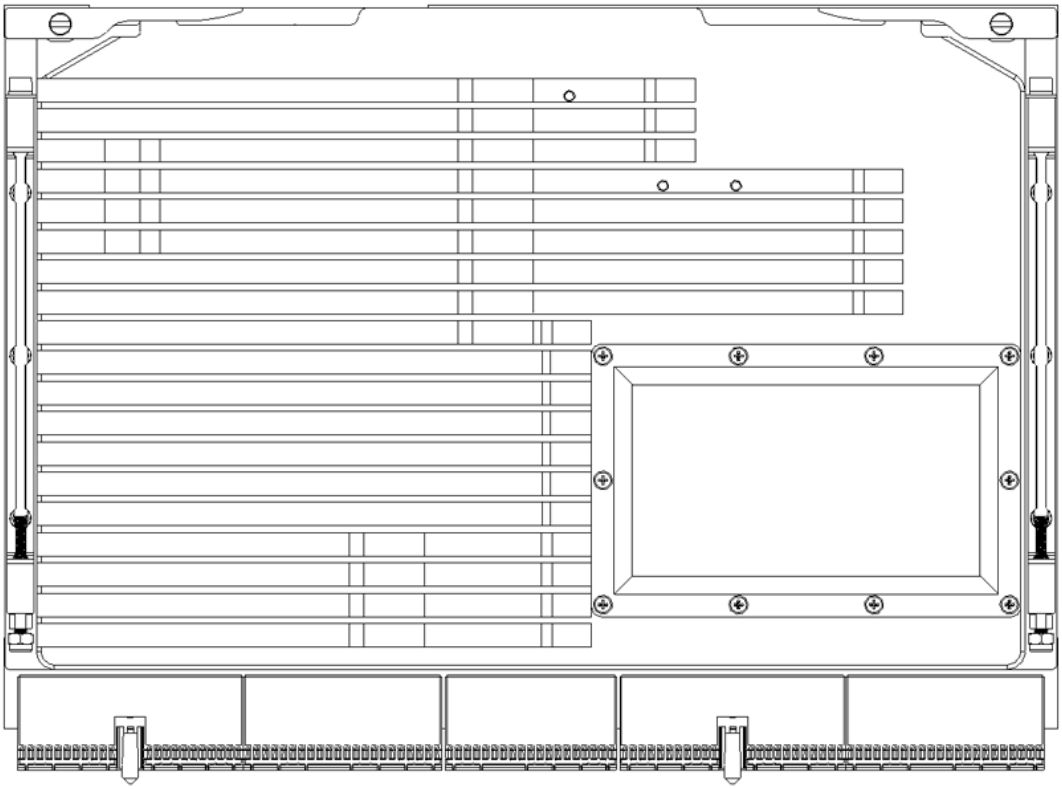
2.2.1 Installation of CPU Module

1) Place the module back upward
2) Align the screw holes and the radiator module placement
3) Install the 5 pan head screws



2.2.2 Installation of PCBA

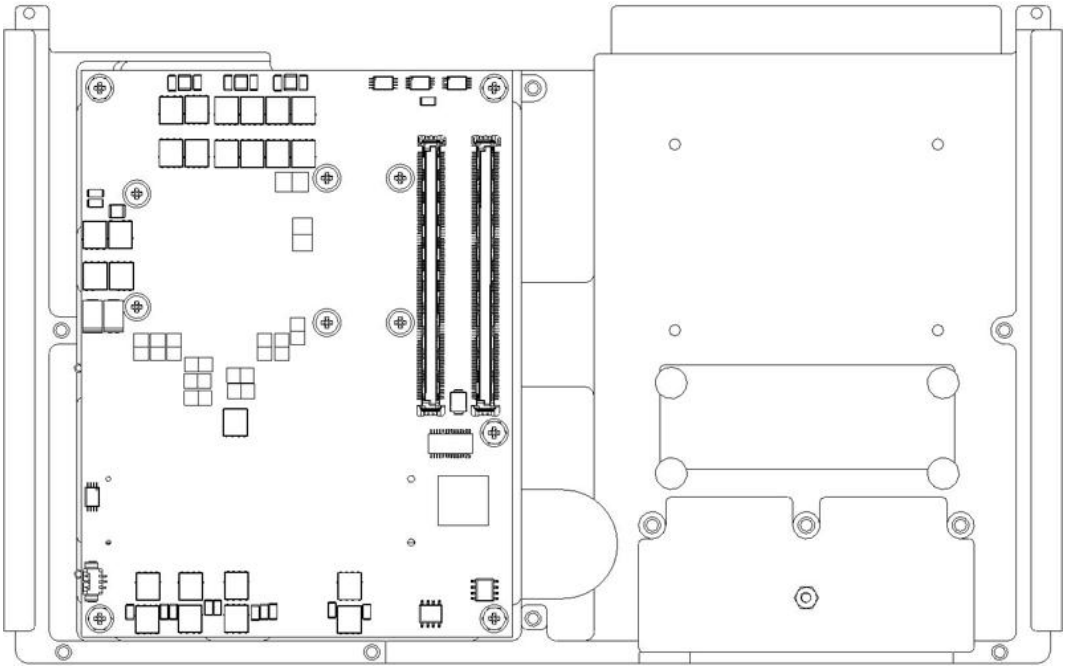
The radiator is mounted on the PCBA use screws



2.1 Air Cooled

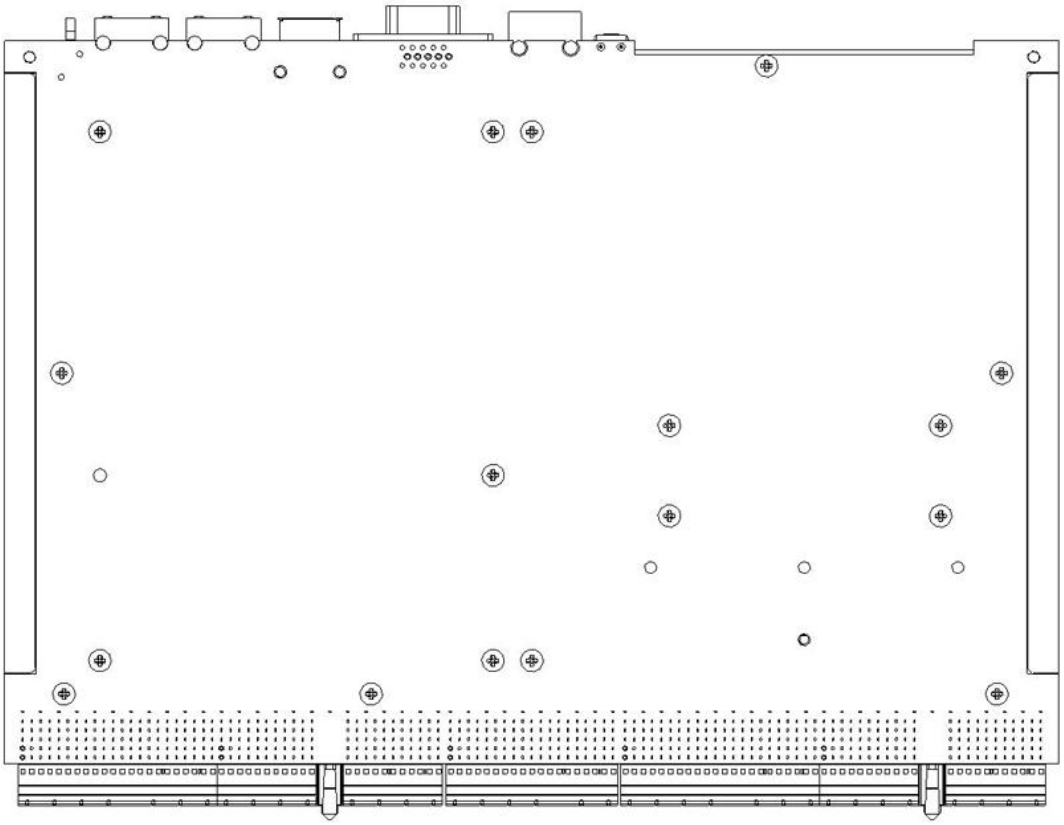
2.2.1 Installation of CPU Module

1) Place the module back upward
2) Align the screw holes and the radiator module placement
3) Install the 5 pan head screws



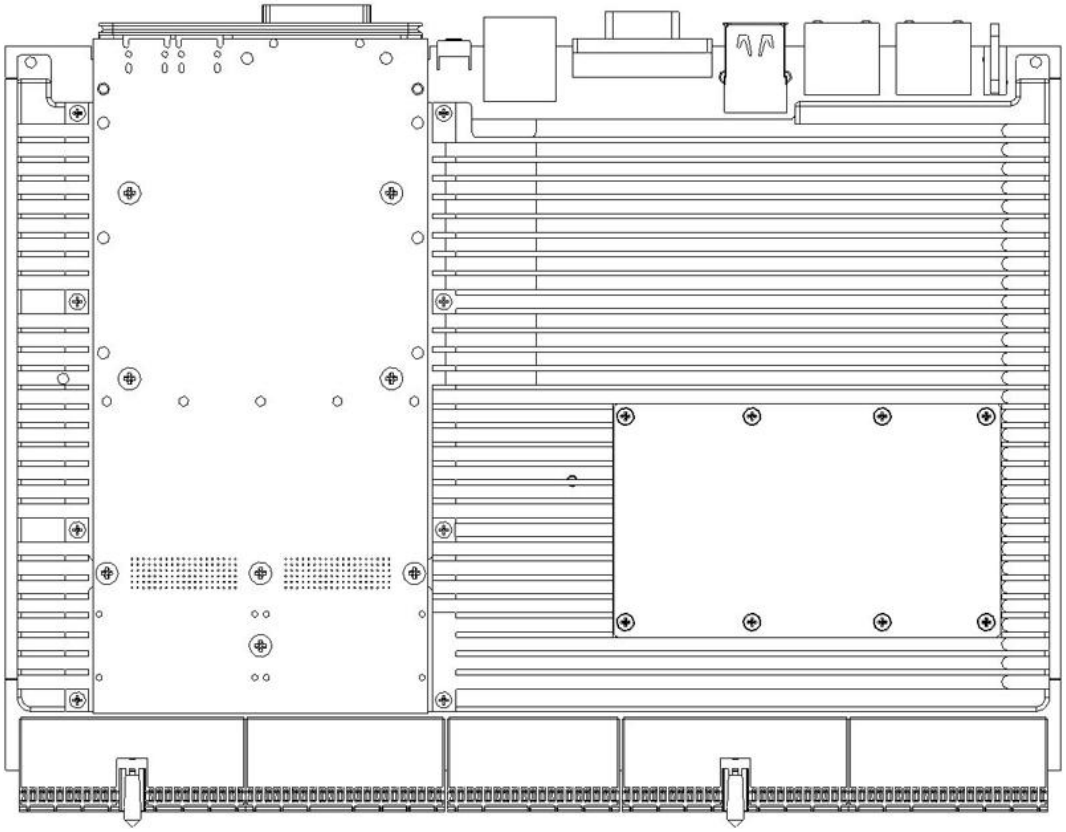
2.2.2 Installation of PCBA

The radiator is mounted on the PCBA use screws

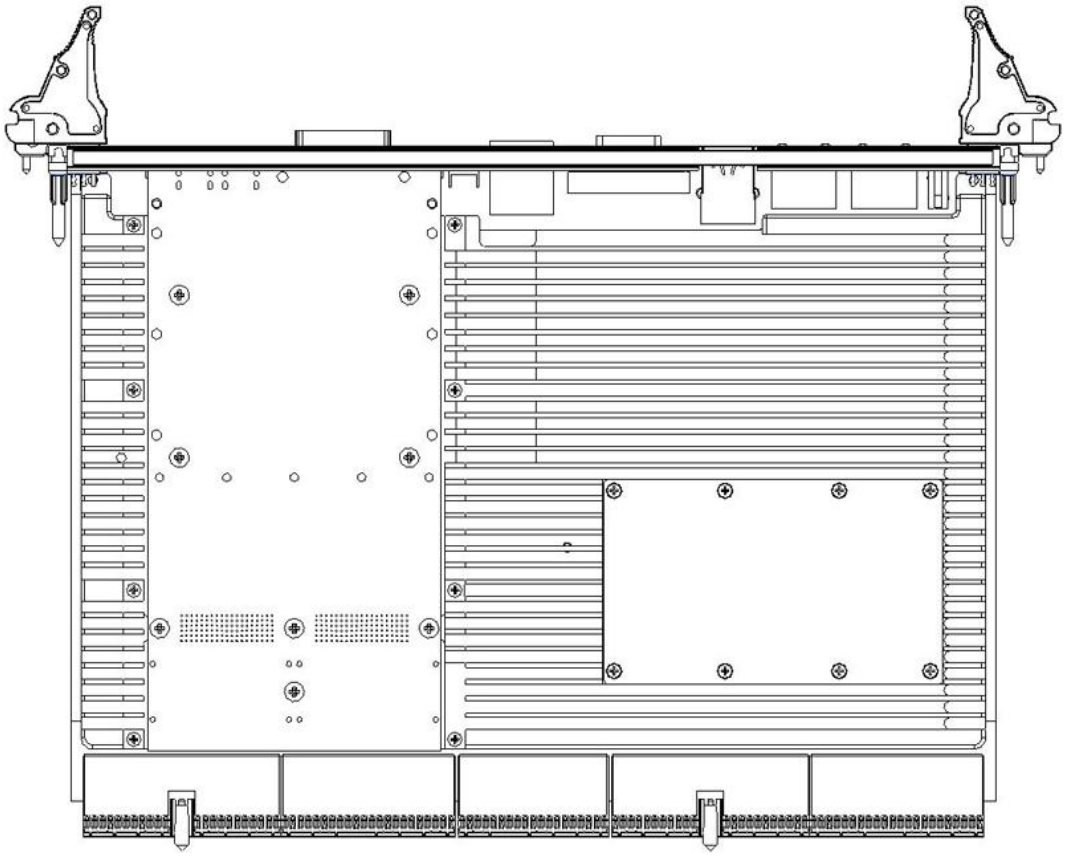


2.2.3 Installation of a XMC Module on CP62101 Boards

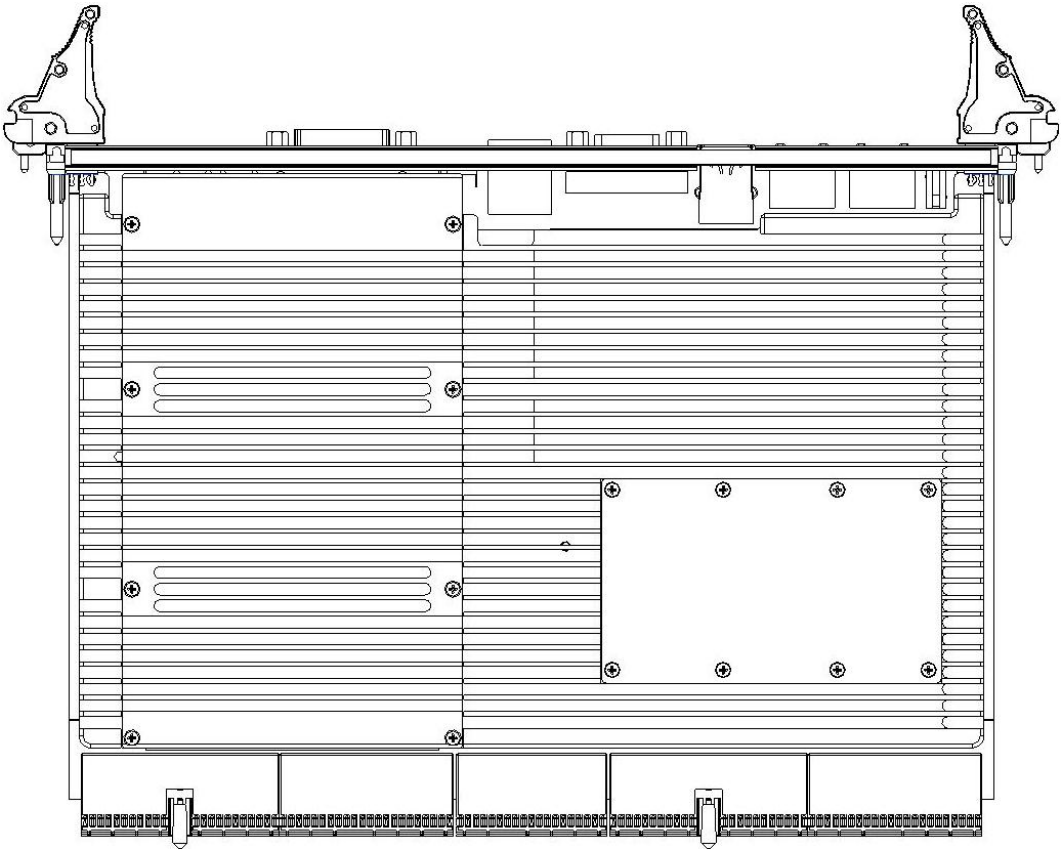
1) Remove the top side cover.
2) Align the holes at the front and middle of the XMC module with the matching holes on the CP62101.
3) Lower the XMC module, component side down, fitting the XMC connectors into their mating connectors on the CP62101. Press them together so that the friction from the pins holds the XMC module in place.
4) Install the 8 pan head screws.



2.2.4 Installation of a front panel on CP62101 Boards



2.2.5 Installation of a XMC cover on CP62101 Boards



CHAPTER 3

3. SPECIFICATIONS

3.1 Functional Specification

- Support Intel® Core™2 i3/i5/i7 processors and Intel® Celeron processor
- Intel QM67 chipset (i3, i5, i7 series CPU); Intel HM65 chipset (Celeron series CPU)
- Compatible different PCI bus, 64-bit/66(133) MHz and 32-bit/33 MHz, Up to support 7 peripheral PCI slots
- On board dual channel DDR3 1333MHz SO-DIMM, up to 16GB memory module supported
- On board SSD SLC up to 64GB
- Three SATA interfaces via rear CPCI connector
- One VGA display interface switchable between front and rear panel, maximum CRT output resolution is 2048 x 1536
- Two DP interfaces via rear CPCI connector
- Three Gigabit Ethernet interfaces , via rear CPCI connector
- One Gigabit Ethernet switchable between front and rear panel
- Three serial communication interfaces RS-232/TTL optional and the forth one is RS-422/RS-232/TTL optional
- Two USB2.0 interfaces in front panel and 4 USB3.0 through rear panel
- On board one XMC interface
- On board one PMC interface
- 5V, 3.3V CompactPCI VIO configurable
- One I^2C interface via rear CPCI connector
- 1-255 grade watch dog
- EEPROM BIOS, data backup without battery except RTC clock
- The same PCB for Air Cooling version and conduction cooling version
- Operating system support includes MS-DOS/Windows7/XP/VxWorks /Linux

3.2 Environment Specification

3.2.1 Storage Temperature

The CP62101 might be malfunction and be mechanically damaged if stored out of the temperature

range from -55℃ to +85℃.

3.2.2 Working Temperature

The working temperature of CP62101 can be extended to -40～+70℃ as industrial grade, and CP62101 is fully tested in such condition and is able to work normally within the scope of PICMG 2.1 specification.

3.2.3 Power Requirement

The power consumption CP62101 is about 45 Watt with Intel® i7 2655LE processor running at full speed (exact power consumption will be difference for difference on board CPU). The primary power inputs of CP62101 is +5V, ＋3.3V and +12V. however, The CP62101 processor board can only endure less than ±5％noise on the power rail.

3.2.4 Board Size

Length x Width: 233×160 (mm)
Height: 4HP

3.2.5 Product Weight

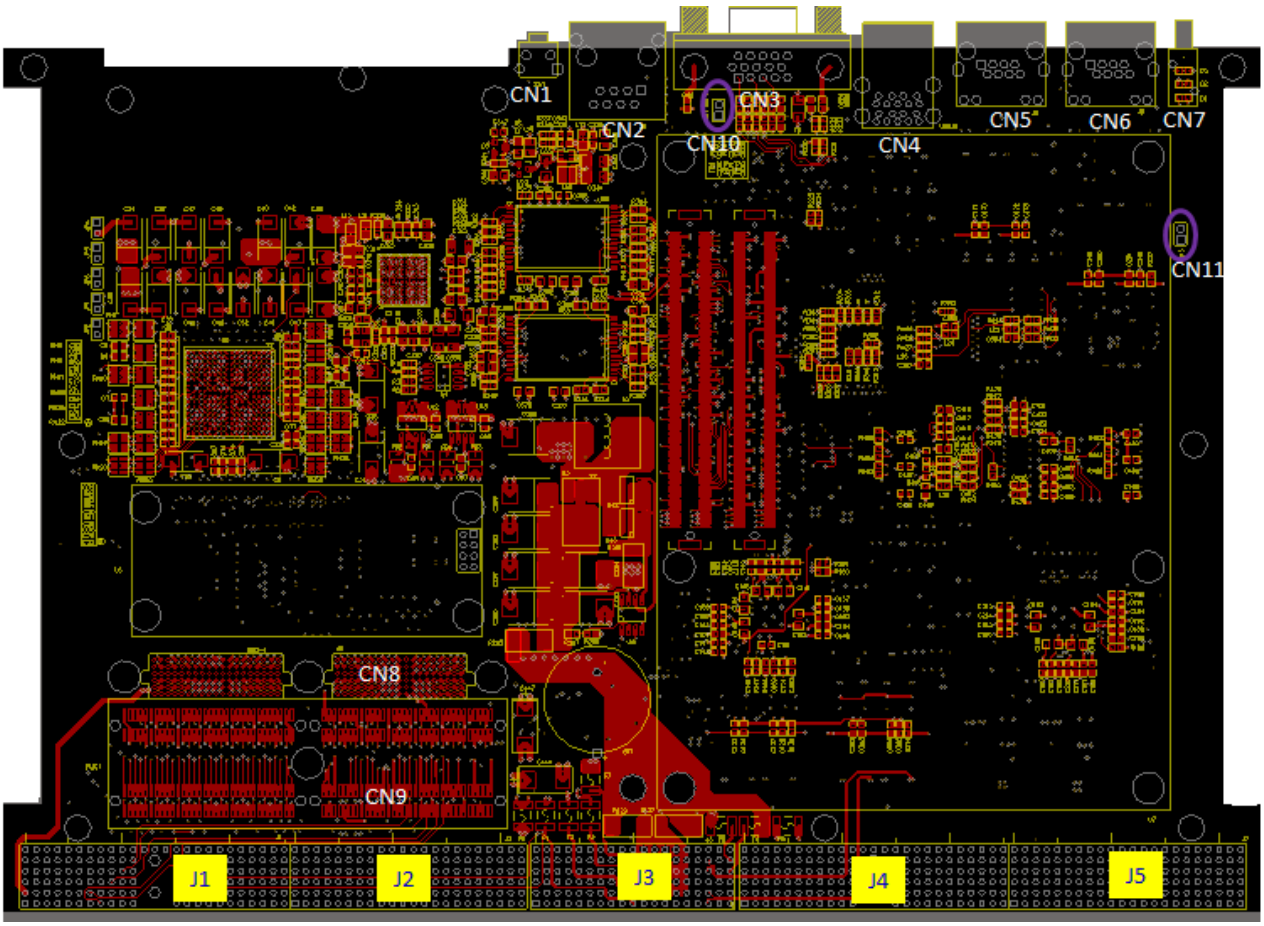
Conduction cooled：Less than 1200g including head sink
Air Cooled：Less than 1100g including head sink

CHAPTER 4

4. PHYSICAL CHARACTERISTICS

4.1 Main Components Location

Main components location as below:



3—1

The jumper and connector functional definition are shown as below:

CN1	system reset button (RST)
CN2	RJ45 serial port connector
CN3	VGA connector
CN4	Front USB connector
CN5,CN6	Ethernet connectors
CN7	Front panel status light
CN8	XMC connector
CN9	PMC connector
CN10	VGA front-rear switch
CN11	Ethernet front-rear switch
J1/J2/J3/J4/J5	CPCI connector

table 3—1 Jump and connector

4.2 Jumper Introduce

Because all jumpers and front I/Os are covered by heat sink on conduction cooling version, LinkedHope has to fix all jumper configurations during the CP62101 board assembly process.
Users could set Ethernet and VGA output from front or rear via connector CN11 and CN10. The relationship between switch and function has shown below:

CONN	Status	Function	Status	Function
CN10	Close	VGA output from rear	Open	VGA output from front
CN11	Close	GbE output from front	Open	GbE output from rear

Table 3-2 front-rear switch setting

all factory default configuration of CP62101 will be from front panel if no statement.

4.3 Front Panel Connectors

4.3.1 Front panel connectors drawings

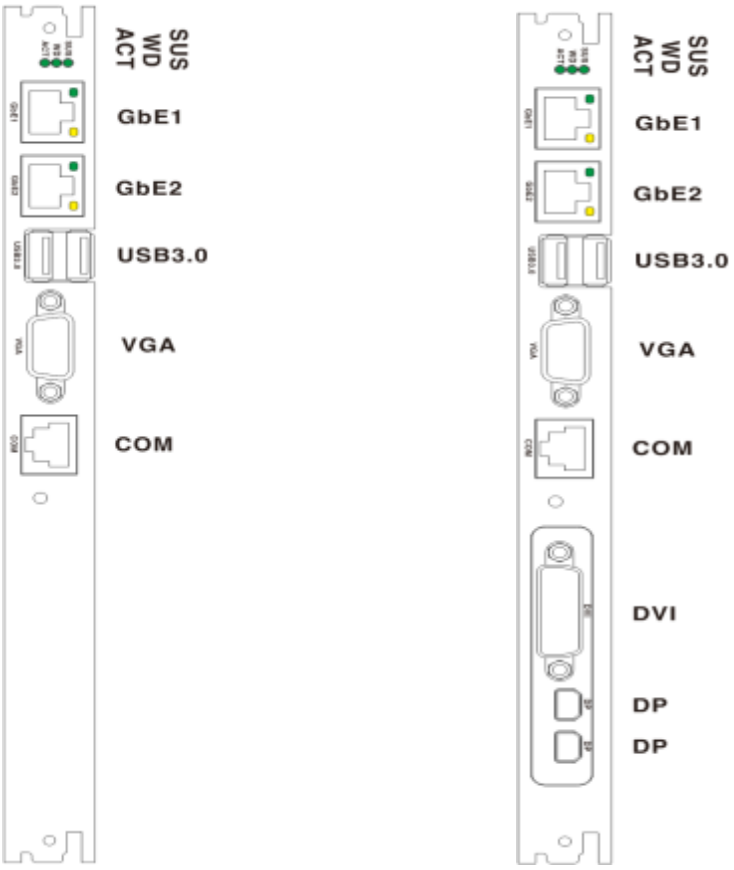


Figure 3-2 The left drawing is no XMC board installed，the right drawing is XMC board installed

4.3.2 Front panel RJ45 standard COM1 connector

CN2 in front panel is standard RJ45 connector serial communication port COM1. It can be connected to standard UART device. Figure 3-3 and table 3-3 is pin out description.

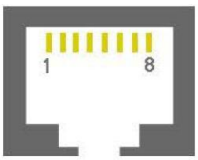


Figure 3-3

PIN	1	2	3	4	5	6	7	8
Signal	**RTS#**	**DTR#**	**TXD**	**GND**	**GND**	**RXD**	**DSR#**	**CTS#**

Table 3-3

4.3.3 USB Connectors

Six USB ports are supported on this board. Two ports are on board USB2.0, the other four are USB3.0 connected to rear I/O.

User Instructions

1) Must use qualified USB device and make sure ground connection well done. The board might be damaged in case the USB ground connection is not performed.
2) Please touch chassis to discharge before using USB device.
3) Please make sure Operating System is in “Ready” status when you remove USB device.

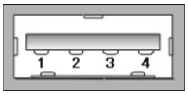


Figure 3—4

CN4 pin out definition

Pin	1	2	3	4
Signal	**+5V**	**-Data**	**+Data**	**GND**

Table 3-4 On board USB definition

4.3.4 VGA Connector on Front Panel

CN3 is a standard VGA connector (DB15). Figure 3-5 and table 3-5 are CN3 pin out description.

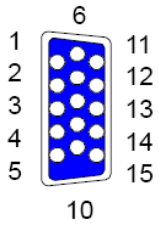


Figure 3—5

PIN	SIGNAL	PIN	SIGNAL
1	VGA_R_R	2	VGA_G_R
3	VGA_B_R	4	NC
5	GND	6	GND
7	GND	8	GND
9	VCC_VGA	10	GND
11	NC	12	VGA_DDAT_S
13	VGA_HSY_S	14	VGA_VSY_S
15	VGA_DCLK_S	16	GND

Table 3-5 On board VGA CN3 definition

4.3.5 CPCI Connectors

J1 connector pin out definition (PCI bus)

PIN	Z	A	B	C	D	E	F
1	GND	+5V	-12V	TRST_L	+12V	+5V	GND
2	GND	TCK	+5V	TMS	NC	TDI	GND
3	GND	S_INTA_L	S_INTB_L	S_INTC_L	+5V	S_INTD_L	GND
4	GND	IPMB PWR	GND	V(I/O)	INTP	INTS	GND
5	GND	RSV	RSV	PCI_RST_D	GND	S_GNT0	GND
6	GND	S_REQ0	GND	+3.3V	S_CLKOUT0	S_AD31	GND
7	GND	S_AD30	S_AD29	S_AD28	GND	S_AD27	GND
8	GND	S_AD26	GND	V(I/O)	S_AD25	S_AD24	GND
9	GND	S_C/BE3	NC	S_AD23	GND	S_AD22	GND
10	GND	S_AD21	GND	+3.3V	S_AD20	S_AD19	GND
11	GND	S_AD18	S_AD17	S_AD16	GND	S_C/BE2	GND
12							
13							
14							
15	GND	+3.3V	S_FRAME_L	S_IRDY_L	GND	S_TRDY_L	GND
16	GND	S_DEVSEL_L	PCIXCAP	V(I/O)	S_STOP_L	S_LOCK_L	GND
17	GND	+3.3V	IPMB SCL	IPMB SDA	GND	S_PEER_L	GND
18	GND	S_SEER_L	GND	+3.3V	S_PAR	S_C/BE1	GND
19	GND	+3.3V	S_AD15	S_AD14	GND	S_AD13	GND
20	GND	S_AD12	GND	V(I/O)	S_AD11	S_AD10	GND
21	GND	+3.3V	S_AD9	S_AD8	S_M66EN	S_C/BE0	GND
22	GND	S_AD7	GND	+3.3V	S_AD6	S_AD5	GND
23	GND	+3.3V	S_AD4	S_AD3	+5V	S_AD2	GND
24	GND	S_AD1	+5V	V(I/O)	S_AD0	S_ACK64_L	GND
25	GND	+5V	S_REQ64_L	ENMU_R#	+3.3V	+5V	GND

Table 3—8

J2 connector signal pin out definition (PCI bus)

PIN	Z	A	B	C	D	E	F
1	GND	S_CLKOUT1	GND	S_REQ1	S_GNT1	S_REQ2	GND
2	GND	S_CLKOUT2	S_CLKOUT3	GND	S_GNT2	S_REQ3	GND
3	GND	S_CLKOUT4	GND	S_GNT3	S_REQ4	S_GNT4	GND
4	GND	V(I/O)	RSV	S_C/BE7	GND	S_C/BE6	GND
5	GND	S_C/BE5	dev64	V(I/O)	S_C/BE4	S_PAR64	GND
6	GND	S_AD63	S_AD62	S_AD61	GND	S_AD60	GND
7	GND	S_AD59	GND	V(I/O)	S_AD58	S_AD57	GND

8	GND	S_AD56	S_AD55	S_AD54	GND	S_AD53	GND
9	GND	S_AD52	GND	V(I/O)	S_AD51	S_AD50	GND
10	GND	S_AD49	S_AD48	S_AD47	GND	S_AD46	GND
11	GND	S_AD45	GND	V(I/O)	S_AD44	S_AD43	GND
12	GND	S_AD42	S_AD41	S_AD40	GND	S_AD39	GND
13	GND	S_AD38	GND	V(I/O)	S_AD37	S_AD36	GND
14	GND	S_AD35	S_AD34	S_AD33	GND	S_AD32	GND
15	GND	RSV	GND	FAL#	SW_REQ1#	SW_GNT1#	GND
16	GND	RSV	RSV	DEG#	GND	RSV	GND
17	GND	RSV	GND	SYS_RESET1#	SW_REQ2#	SW_GNT2#	GND
18	GND	RSV	RSV	RSV	GND	RSV	GND
19	GND	GND	GND	IPMB2 SDA	IPMB2_SCL	IPMB2_Alert	GND
20	GND	PCICLK1	GND	RSV	GND	RSV	GND
21	GND	PCICLK2	GND	RSV	RSV	RSV	GND
22	GND	GA4	GA3	GA2	GA1	GA0	GND

Table 3—9

J3 connector signal pin out definition

PIN	Z	A	B	C	D	E	F
1	GND	COM2_RTS#	COM2_RX	COM2_DSR#	COM2_DCD#	RIO_ID1	GND
2	GND	COM2_RI#	COM2_DTR#	COM2_CTS#	COM2_TX	COM4_TX	GND
3	GND	COM4_DTR#	COM4_RTS#	COM3_RX_N	COM3_RX_P	COM4_RX	GND
4	GND	COM4_CTS#	COM4_DSR#	COM3_TX_N	COM3_TX_P	COM4_DCD#	GND
5	GND	VGA_BLUE	VGA_HSYNC	VGA_VSYNC	VGADDC_CLK	COM4_RI#	GND
6	GND	VGA_RED	VGA_GREEN	VGADDC_DATA	DEBUG_CLK	DEBUG_DATA	GND
7	GND	VCC_RIO_3.3V	COM3_RTS#	GPIO1	GPIO2	SPEAKER	GND
8	GND	R_USB_1_N	R_USB_1_P	GND	R_USB_3_N	R_USB_3_P	GND
9	GND	R_USB_2_N	R_USB_2_P	GND	R_USB_4_N	R_USB_4_P	GND
10	GND	R_USB2_VCC	R_USB1_VCC	GND	R_USB4_VCC	R_USB3_VCC	GND
11	GND	COM3_RI#	+12V_add	GND	+12V_add	+12V_add	GND
12	GND	COM3_DCD#	+12V_add	GND	+12V_add	+12V_add	GND
13	GND	GBE1_ACT	GBE2_ACT	COM3_CTS#	+12V_add	FAN_SENSE1	GND
14	GND	GBE1_LNK	GBE2_LNK	Lpab_CT1	+12V_add	FAN_SENSE2	GND
15	GND	GBE2_MDI1_P	GBE2_MDI1_N	GND	GBE2_MDI3_P	GBE2_MDI3_N	GND
16	GND	GBE2_MDI0_P	GBE2_MDIO_N	GND	GBE2_MDI2_P	GBE2_MDI2_N	GND
17	GND	GBE1_MDI1_P	GBE1_MDI1_N	GND	GBE1_MDI3_P	GBE1_MDI3_N	GND
18	GND	GBE1_MDI0_P	GBE1_MDI0_N	GND	GBE1_MDI2_P	GBE1_MDI2_N	GND
19	GND	VCC_RIO	VCC_RIO	VCC_RIO_3.3V	+12V	-12V	GND

Table 3—10

J3 connector signal definition

Signal	Definition

COM2,COM4	COM2,COM4 Signaling (RS-232/TTL)
COM3	COM3Signaling (RS-422/RS-232/TTL)
VGA	VGA Signal
USB1 _P to USB4_P	USB Port Signaling
FAN 1,2	Fan Sensoring
SPEAKER	Standard PC Speaker
GBE1,2,3	Rear I/O LAN 1,LAN2,LAN3
+12V_add	+12V power
R_USB_VCC	USB power

J4 connector signal pin out definition

PIN	Z	A	B	C	D	E	F
1	GND	PIM_61	PIM_63	GND	PIM_62	PIM_64	GND
2	GND	PIM_57	PIM_59	GND	PIM_58	PIM_60	GND
3	GND	GND	GND	GND	GND	GND	GND
4	GND	PIM_53	PIM_55	GND	PIM_54	PIM_56	GND
5	GND	PIM_49	PIM_51	GND	PIM_50	PIM_52	GND
6	GND	GND	GND	GND	GND	GND	GND
7	GND	PIM_45	PIM_47	GND	PIM_46	PIM_48	GND
8	GND	PIM_41	PIM_43	GND	PIM_42	PIM_44	GND
9	GND	GND	GND	GND	GND	GND	GND
10	GND	PIM_37	PIM_39	GND	PIM_38	PIM_40	GND
11	GND	PIM_33	PIM_35	GND	PIM_34	PIM_36	GND
12							
13							
14							
15	GND	PIM_29	PIM_31	GND	PIM_30	PIM_32	GND
16	GND	PIM_25	PIM_27	GND	PIM_26	PIM_28	GND
17	GND	GND	GND	GND	GND	GND	GND
18	GND	PIM_21	PIM_23	GND	PIM_22	PIM_24	GND
19	GND	PIM_17	PIM_19	GND	PIM_18	PIM_20	GND
20	GND	GND	GND	GND	GND	GND	GND
21	GND	PIM_13	PIM_15	GND	PIM_14	PIM_16	GND
22	GND	PIM_9	PIM_11	GND	PIM_10	PIM_12	GND
23	GND	NC	VCC_RIO	GND	NC	VCC_RIO_3.3V	GND
24	GND	PIM_5	PIM_7	GND	PIM_6	PIM_8	GND
25	GND	PIM_1	PIM_3	GND	PIM_2	PIM_4	GND

Table 3—12

J5 connector signal pin out definition

PIN	Z	A	B	C	D	E	F
1	GND	GND	GND	GND	GND	GND	GND
2	GND	SATA1_RX_P	SATA1_RX_N	GND	SATA1_TX_P	SATA1_TX_N	GND
3	GND	GND	GND	GND	GND	GND	GND
4	GND	SATA2_RX_P	SATA2_RX_N	GND	SATA2_TX_P	SATA2_TX_N	GND
5	GND	GND	GND	GND	GND	GND	GND
6	GND	SATA3_RX_P	SATA3_RX_N	GND	SATA3_TX_P	SATA3_TX_N	GND
7	GND	GND	GND	GND	GND	GND	GND
8	GND	HT3_TX+	HT3_TX-	GND	HT3_RX+	HT3_RX-	GND
9	GND	GND	GND	GND	GND	GND	GND
10	GND	HDMI1_CLK_P	HDMI1_CLK_N	GND	SMB_DAT	SMB_CK	GND
11	GND	COM1_RTS#	HDMI1_HPD	GND	HDMI1_CRTLCLK_N	HDMI1_CTRLCLK_P	GND
12	GND	HDMI1_DATA2_P	HDMI1_DATA2_N	GND	COM1_RI#	COM1_RX	GND
13	GND	HDMI1_DATA0_P	HDMI1_DATA0_N	GND	HDMI1_DATA1_P	HDMI1_DATA1_N	GND
14	GND	GND	GND	GND	GND	GND	GND
15	GND	HDMI2_CLK_P	HDMI2_CLK_N	GND	HDMI2_CTRLCLK_N	HDMI2_CTRLCLK_P	GND
16	GND	COM1_DTR#	HDMI2_HPD	GND	COM1_CTS#	COM1_DCD#	GND
17	GND	HDMI2_DATA2_P	HDMI2_DATA2_N	GND	HDMI2_DATA1_P	HDMI2_DATA1_N	GND
18	GND	HDMI2_DATA0_P	HDMI2_DATA0_N	GND	GND	GND	GND
19	GND	GND	GND	GND	AC_SDIN0	AC_BITCLK	GND
20	GND	COM1_TX	AC_SDIN1	GND	COM1_DSR#	AC_SDIN2	GND
21	GND	AC_SYNC	AC_RST#	GND	AC_SDOUT	SYS_WP#	GND
22	GND	ACA_ACT#	PWM1_OUT	GND	PWM2_OUT	V_BAT	GND

Table 3—13

J5 connector signal definition

Signal	Definition
SATA1,2,3	SATA Port 1.2.3 Signaling
SMB	System Management Bus Signaling
HDMI1	HDMI1 /DP1 signaling
HDMI2	HDMI2/DP2 signaling
AC_..	High-definition audio signaling
PWM	Pulse width modulation output for fan
COM1	COM1 Signaling (RS-232/TTL)
HT0..3	NOT connected (no signal definition)

Table 3-14

4.4 CP62101 Resources Assignment

4.4.1 I/O Resource

The I/O-port addresses of the board are functionally identical to a standard PC/AT. All addresses not mentioned in this table should be available. We recommend that you do not use I/O addresses below 0100h with additional hardware for compatibility reasons, even if available.

I/O Address	Used for	Available	Comment
0000-001F	System Resources	No	fixed
0020-003F	Interrupt Controller	No	fixed
003E-002F	Ext. SIO	No	fixed
0040-005F	Timer, Counter	No	fixed
004E-004F	TPM	No	fixed
0060-006F	Keyboard controller	No	fixed
0070-007F	RTC and CMOS Registers	No	fixed
0080	BIOS Postcode	No	fixed
0081-009F	DMA Controller	No	fixed
00A0-00BF	Interrupt Controller	No	fixed
00C0-00DF	DMA Controller	No	fixed
00F0-00FF	Math Coprocessor	No	fixed
0290-029F	Ext. SIO	No	fixed
03B0 -03DF	VGA	No	fixed
0040-047F	Chipset	No	fixed
04D0-04D1	Chipset	No	fixed
0500-057F	Chipset	No	fixed
0680-069F	Chipset	No	fixed
0B78-0B7F	Chipset	No	fixed
0CF8-0CFF	Chipset	No	fixed

Table 3-16 CP62101 I/O Resource

4.4.2 Interrupt Request (IRQ) Lines

IRQ#	Used for	Available	Comment
0	Timer0	No	-

1	Keyboard	No	-
2	Cascade	No	-
3	External SIO-COM2	Ext. SIO	Dynamic(BIOS default)
4	External SIO-COM1	Ext. SIO	Dynamic(BIOS default)
5	External SIO-LPT1	Ext. SIO	Dynamic(BIOS default)
6	-	Ext. SIO	-
7	-	Ext. SIO	-
8	RTC	No	-
9	ACPI	No	-
10	-	Ext. SIO	-
11	SMBus	No	-
12	PS/2 Mouse	No	-
13	FPU	No	-
14	-	No	-
15	-	No	-
16	LNKA	No	PCIe RP0+PCIe RP4+USB EHCI+ Intel ME+I.G.D
17	LNKB	No	PCIe RP1+PCIe RP5+PCIe2Pata
18	LNKC	No	PCIe RP2+PCIe RP6+PCIe2PCI
19	LNKD	No	PCIe RP3+SATA AHCI
20	LNKE	No	(b)
21	LNKF	No	(b)
22	LNKG	No	(b)
23	LNKH	No	(b)

Table 3-17 IRQ

Note：

a) If the “Used For” device is disabled in setup, the corresponding interrupt is available for other device.

b) ACPI OS decides on particular IRQ usage

4.4.3 PCI Devices

All devices follow the Peripheral Component Interconnect 2.3 (PCI 2.3) respectively the PCI Express Base 1.0a specification. The BIOS and OS control memory and I/O resources. Please see the PCI 2.3 specification for details.

PCI Device	B:D:F	PCI IRQ	Interface	Comment
Host Bridge	0:0:0	None	internal	Chipset

P.E.G. Root Port	0:1:0	LNKA	internal	Chipset
Video Controller	0:2:0	LNKA	internal	Chipset
ME	0:22:0	LNKA	internal	Chipset
GbE	0:25:0	LNKE	PCIe	Chipset
HDA	0:27:0	LNKG	PCIe	Chipset
PCIe Port0	0:28:0	LNKA	internal	Chipset
PCIe Port0 Slot	-	A/B/C/D	PCIe	Port0
PCIe Port1	0:28:1	LNKA	internal	Chipset
PCIe Port1 Slot		B/C/D/A	PCIe	Port1
PCIe Port2	0:28:2	LNKA	internal	Chipset
PCIe Port2 Slot		C/D/A/B	PCIe	Port2
PCIe Port3	0:28:3	LNKA	internal	Chipset
PCIe Port3 Slot		D/A/B/C	PCIe	Port3
PCIe Port4	0:28:4	LNKA	internal	Chipset
PCIe Port4 Slot		A/B/C/D	PCIe	Port4
PCIe Port5	0:28:5	LNKA	internal	Chipset
PCIe Port5 Slot		B/C/D/A	PCIe	Port5
PCIe Port6	0:28:6	LNKA	internal	Chipset
PCIe Port6 Slot		C/D/A/B	PCIe	Port6
PCIe Port7	0:28:7	LNKA	internal	Chipset
EHCI	0:29:0	LNKH	internal	Chipset
LPC Bridge	0:31:0	-	internal	Chipset
SATA	0:31:2	LNKD	internal	Chipset
SMBus	0:31:3	LNKC	internal	Chipset
PCIe2PATA	X:00:0	LNKA	PCIe	Slot5
PCIe2PCI	Y:00:0	LNKA	PCIe	Slot6

Table 3-19 PCI Devices

4.4.4 Memory Resource

The first 640 KB of DRAM are used as main memory. Using DOS, you can address 1 MB of memory directly. Memory area above 1 MB (high memory, extended memory) is accessed under DOS via special drivers such as HIMEM.SYS and EMM386.EXE, which are part of the operating system. Please refer to the operating system documentation or special textbooks for information about HIMEM.SYS and EMM386.EXE. Other operating systems (Linux or Windows versions) allow you to address the full memory area directly.

Upper Memory	Used for	Available	Comment
A0000h-BFFFFh	VGA Memory	No	Mainly used by graphic controller
C0000h-CFFFFh	VGA BIOS	No	Used by onboard VGA ROM
D0000h-DFFFFh		Yes	Free for shadow RAM in standard config
E0000h-FFFFFh	System BIOS	No	Fixed
20000000h-201FFFFFh	IGFX	No	Fixed
40000000h-401FFFFFh	IGFX	No	Fixed
E0000000h-FEAFFFFh	PCIe Config Space	No	Fixed
FED00000h-FED00EFFh	HPET	No	Fixed
FED10000h-FED17FFFh	MCH	No	Fixed
FED18000h-FED18FFFh	DMI	No	Fixed
FED19000h-FED19FFFh	EPBA	No	Fixed
FED1C000h-FED1FFFh	RCBA	No	Fixed
FED20000h-FED3FFFFh	TXT	No	Fixed
FED40000h-FED44FFFh	TPM	No	Fixed
FED45000h-FED8FFFFh	TPM	No	Fixed
FED90000h-FED93FFFh	VT-d	No	Fixed
FEE00000h-FEEFFFFFh	IOxAPIC	No	Fixed
FF000000h-FFFFFFFFh	BIOS Flash	No	Fixed

Table 3-20 Memory Resource

4.4.5 SMBUS

Address	Device	Comment
12h	SMART_CHARGER	Not to be used with any SM bus device except a charger
14h	SMART_SELECTOR	Not to be used with any SM bus device except a Selector manager
16h	SMART_BATTERY	Not to be used with any SM bus device except a battery
5Ch	HW Monitor	Do not use under any circumstances
A0h	DDR3 Chanel A	Do not use under any circumstances
30h	DDR3 Thermal Chan. A	Do not use under any circumstances
A4h	DDR3 Chanel A	Do not use under any circumstances
34h	DDR3 Thermal Chan. A	Do not use under any circumstances

CHAPTER 5

5. BIOS Setting

5.1 Entering the BIOS

The AMI® BIOS Setup Utility, also named AMI® Aptio Setup Utility, changes system behavior by modifying firmware configuration. The setup program use a number of menus to turn feature on or off, the sequence of bootable device can be also modified by this setup program.
User can press <F2> or <Del> key during BIOS POST to enter BIOS setup utility.
The Setup menu is quite extensive, and is provided with context-sensitive help information, which is displayed in the right-hand panel on screen.

Functional keystrokes in POST:

Key	Function
DEL	Enter BIOS Setup
F2	Enter BIOS Setup
F7	Boot Menu
Ctrl + I	Raid Config Setup

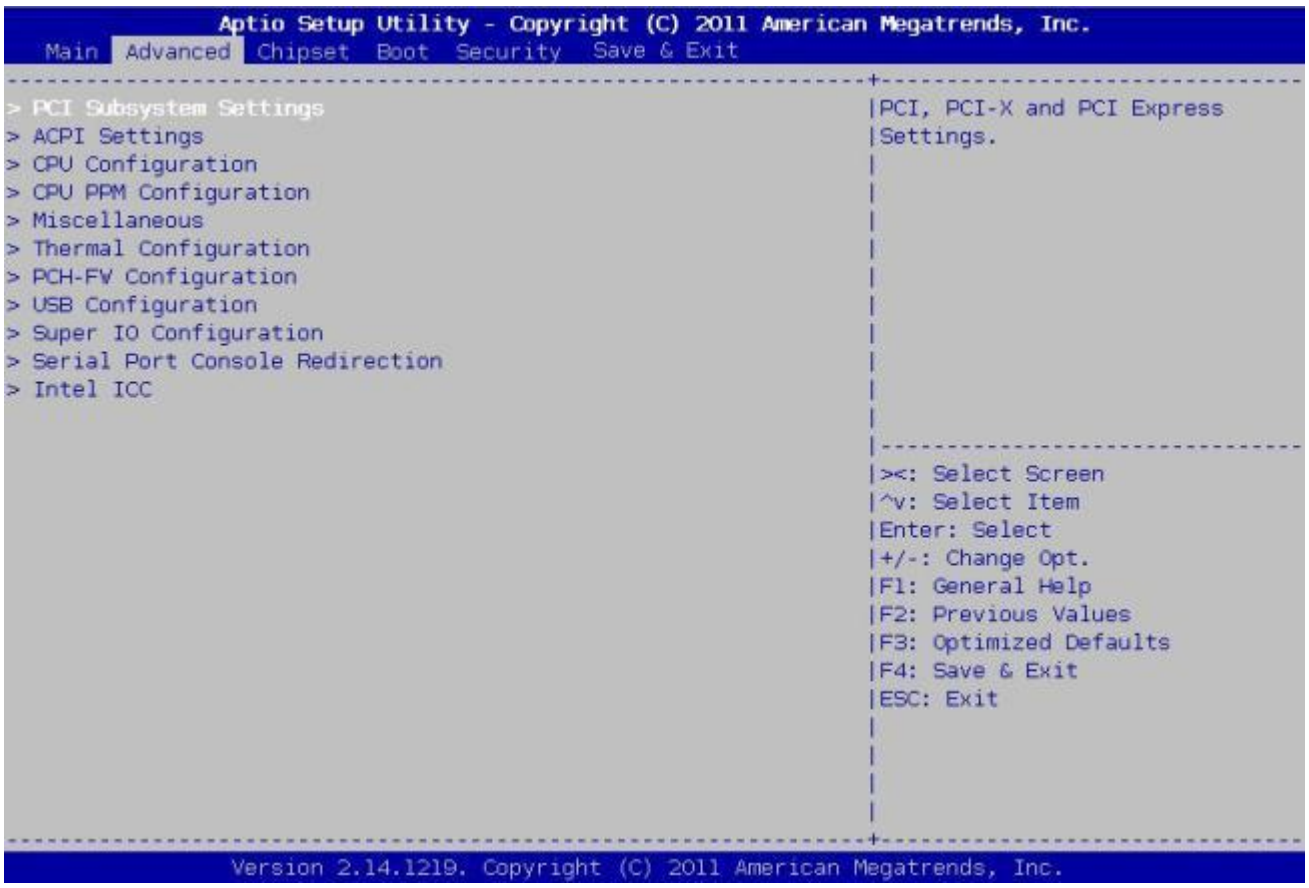
Key used in BIOS setup utility:

Key	Function
← or → Arrow key	Select a menu.
↑ or ↓ Arrow key	Select fields in current menu.
<Home> or <End>	Move cursor to top or bottom of current window.
<PgUp> or <PgDn>	Move cursor to next or previous page.
+/-	Change Option
<Enter>	Execute command or select submenu.
<F1>	General Help window.
<F2>	Previous Values
<F3>	Load the optimized default configuration.
<F4>	Save and exit.
<Esc>	Exit menu.

5.2 Main

Feature	Option	Description
System Language	English	Use this function to select the system language. Currently, only English is supported.
System Date	<WD MM/DD/YYYY>	Use this function to change the system date. Select System Date using the Up and Down <Arrow> keys. Enter the new values through the keyboard or press +/- to increment/decrement values. Use “Tab” to switch between date elements.
System Time	<HH:MM:SS>	Use this function to change the system time. Select System Time using the Up and Down <Arrow> keys. Enter the new values through the keyboard or press +/- to increment/decrement values. Use “Tab” to switch between time elements.

5.3 Advanced


Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
> PCI Subsystem Settings
> ACPI Settings
> CPU Configuration
> CPU PPM Configuration
> Miscellaneous
> Thermal Configuration
> PCH-FW Configuration
> USB Configuration
> Super IO Configuration
> Serial Port Console Redirection
> Intel ICC
PCI, PCI-X and PCI Express Settings.
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

➔ PCI Subsystem Settings

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Advanced
PCI Bus Driver Vers. V 2.05.01
PCI Option ROM Handling
PCI ROM Priority [EFI Compatible ROM]
PCI Common Settings
PCI Latency Timer [32 PCI Bus Clocks]
VGA Palette Snoop [Disabled]
PERR# Generation [Disabled]
SERR# Generation [Disabled]
In case of multiple Option ROMs (Legacy and EFI Compatible), specifies what PCI Option ROM to launch.
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Feature	Option	Description
PCI ROM Priority	**EFI Compatible ROM** Legacy OPROM	In case of multiple Option ROMs (Legacy and EFI Compatible), specifies what PCI Option ROM to launch
CI Latency Timer	**32 PCI Bus Clocks** 64 PCI Bus Clocks 128 PCI Bus Clocks 256 PCI Bus Clocks	Value to be programmed into PCI Latency Timer Register
VGA Palette Snoop	Enabled **Disabled**	Enables or Disables VGA Palette Registers Snooping
PERR# Generation	Enabled **Disabled**	Enables or Disables PCI Device to Generate PERR#
SERR# Generation	Enabled **Disabled**	Enables or Disables PCI Device to Generate SERR# 63

➔ ACPI Settings

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Advanced
ACPI Settings
Enable ACPI Auto Configuration [Disabled]
Enable Hibernation [Enabled]
ACPI Sleep State [S3 (Suspend to RAM)]
Lock Legacy Resources [Disabled]
Enables or Disables BIOS ACPI Auto Configuration.
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

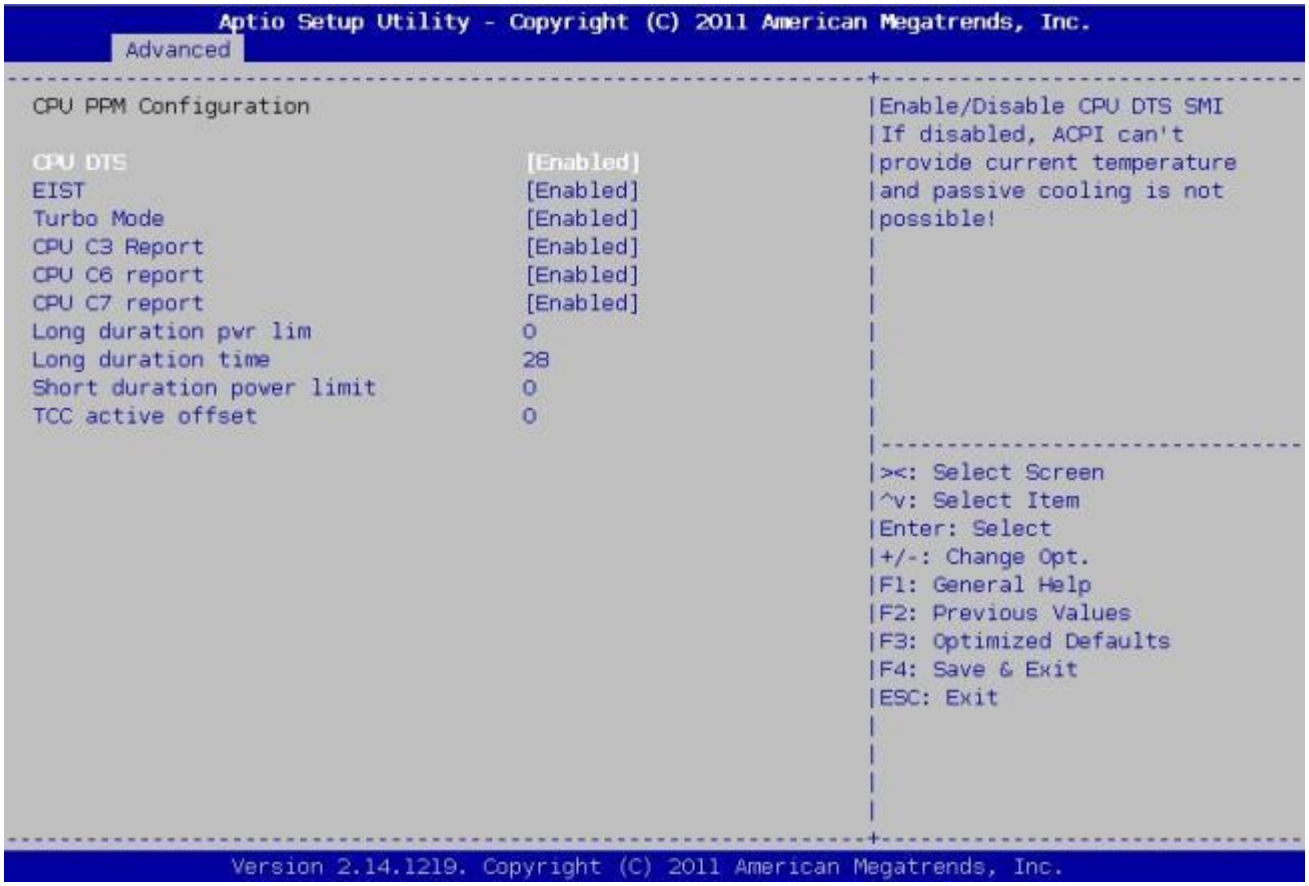
Feature	Option	Description
Enable ACPI Auto configuration	Enabled **Disabled**	Enables or Disables BIOS ACPI Auto Configuration
Enable Hibernation	**Enabled** Disabled	Enables or Disables System ability to Hibernate (OS/S4 Sleep State)

ACPI Sleep State	**S3(Suspend to RAM)** S4(Suspend to Disk)	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed
Lock Legacy Resources	Enabled **Disabled**	Lock the legacy resources

➔ CPU Configuration

Feature	Option	Description
Hyper-threading	**Enabled** Disabled	Enables/Disables the IntelR Hyper Threading Technology HTT supported by Core i7/i5/i3
Active Proc Cores	All 1 2 3	Number of cores to enable in each processors package
Execute Disable Bit	**Enabled** Disabled	XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS
Hardware Prefetcher	**Enabled** Disabled	Turn on/off the MLC streamer prefetcher
Adj.Cache Line Pref	**Enabled** Disabled	Turn on/off prefetching of adjacent cache lines
Intel Virtualizition Technology	**Enabled** Disabled	Enable Intel VT funciton

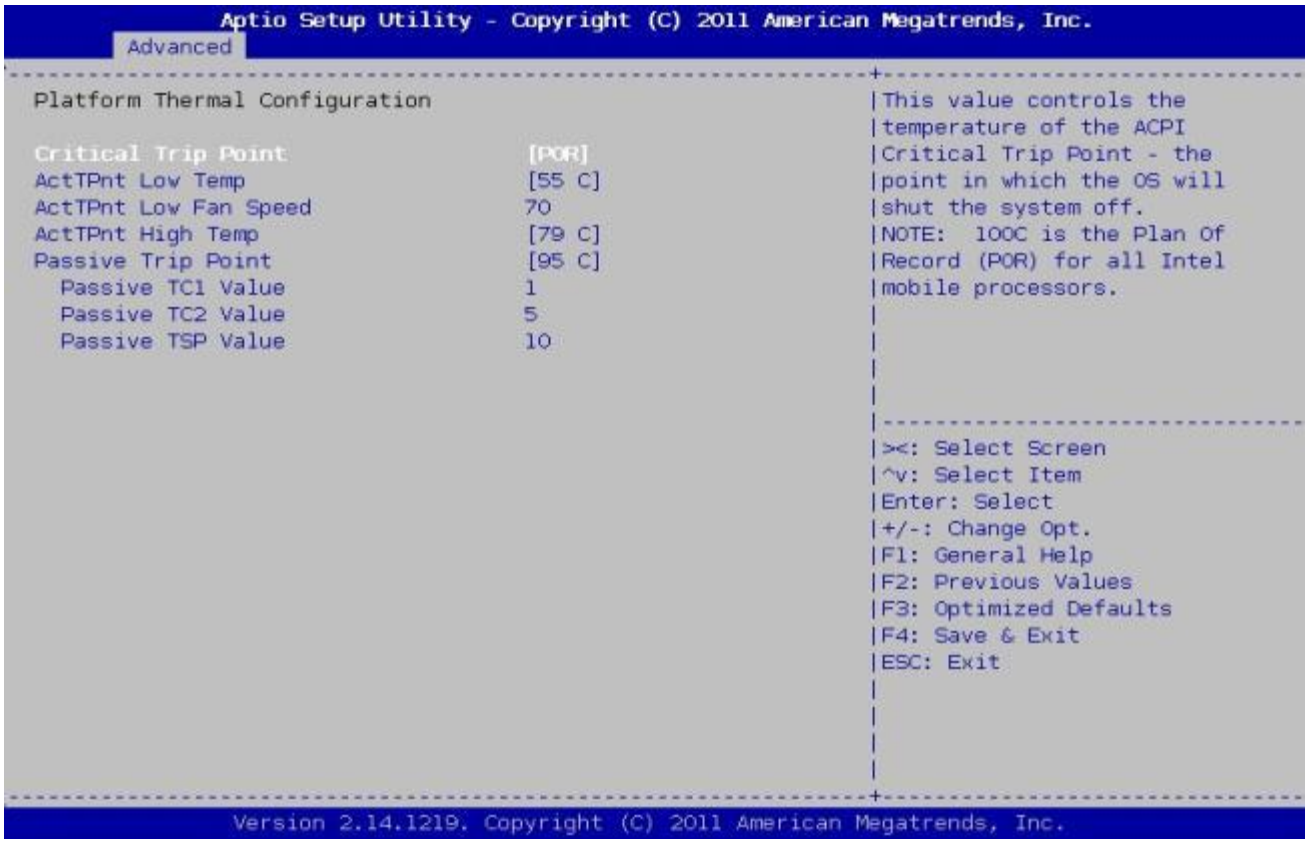
➔ CPU PPM Configuration



Feature	Option	Description
CPU DTS	**Enabled** Disabled	Enables/Disables CPU digital thermal sensors
EIST	**Enabled** Disabled	Enables/Disables the Intel Speedstep Technology (E)IST
Turbo Mode	**Enabled** Disabled	Enables/Disables the Intel Processor Turbo Mode 2.0
CPU C3 Report	**Enabled** Disabled	Enable/Disable C3 State
CPU C6 report	**Enabled** Disabled	Enable/Disable C6 State
CPU C7 report	**Enabled** Disabled	Enable/Disable C7 State
Long duration pwr lim	0	Turbo options
Long duration time	28	Turbo options
Short duration power limit	0	Turbo options
TCC active offset	0	Offset from factory set TCC activation temperature at which the Thermal Control Circuit must be activated. Tcc will be activated at: TCC Activation Temp - TCC Activation Offset

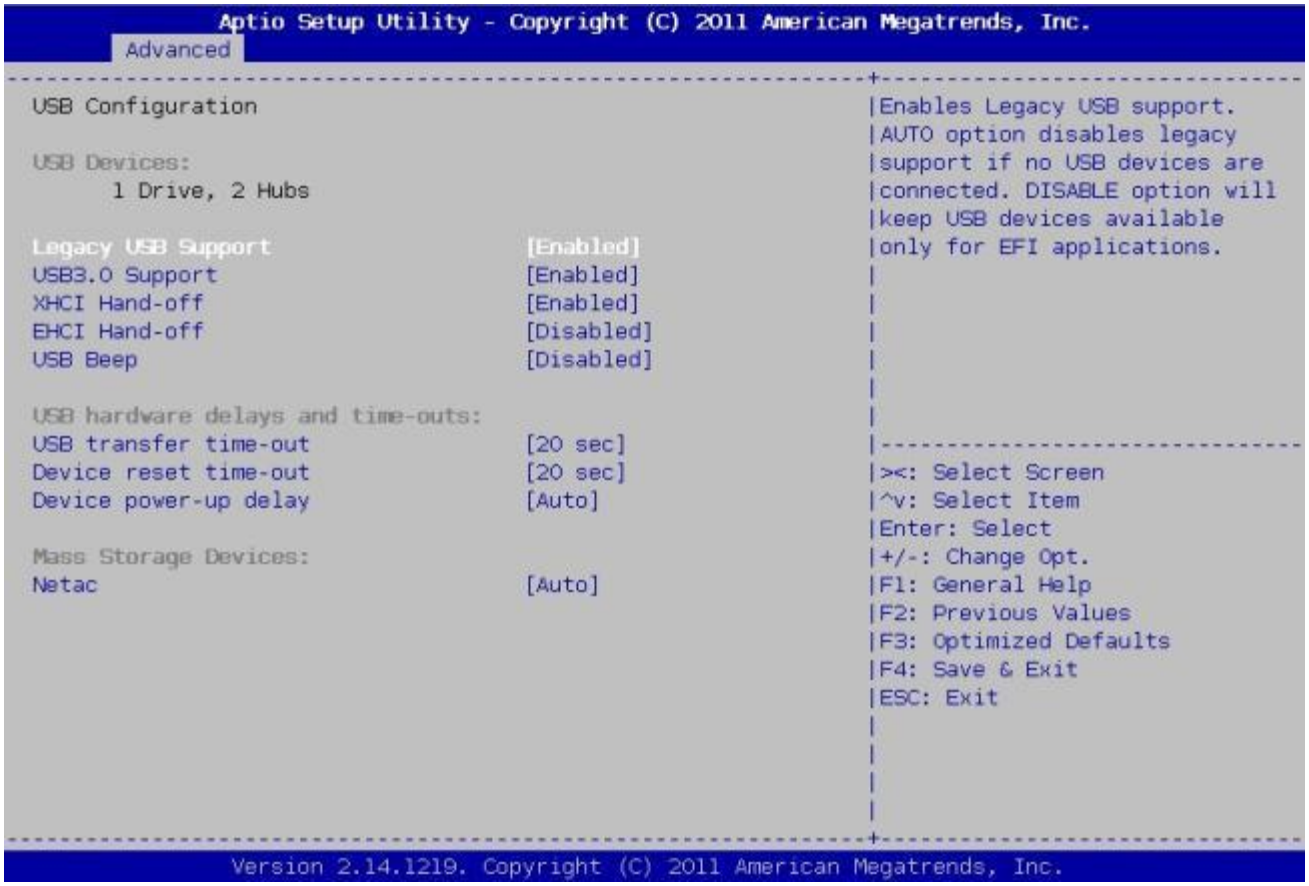
➔ Miscellaneous

➔ Thermal Configuration


Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Advanced
Platform Thermal Configuration
Critical Trip Point [POR]
ActTPnt Low Temp [55 C]
ActTPnt Low Fan Speed 70
ActTPnt High Temp [79 C]
Passive Trip Point [95 C]
Passive TC1 Value 1
Passive TC2 Value 5
Passive TSP Value 10
This value controls the temperature of the ACPI Critical Trip Point - the point in which the OS will shut the system off. NOTE: 100C is the Plan Of Record (POR) for all Intel mobile processors.
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Feature	Option	Description
Critical Trip Point	**POR** 15°C … 127°C	This value controls the temperature of the ACPI Critical Trip Point - the point in which the OS will shut the system off. Note: 100°C is the Plan Of Record (POR) for all Intel mobile processors
ActTPnt Low Temp	Disabled 15°C .. **55°C** … 95°C	This value controls the temperature of the ACPI Active Low Trip Point - the point in which the OS will turn the processor fan on Active Trip Point Low Fan Speed.
ActTPnt Low Fan Speed	70	Active Trip Point Low Fan Speed in percentage. Value must be between 33% - 100%. This is the speed at which fan will run when Active Trip Point Low is crossed.
ActTPnt High Temp	Disabled 15°C … **79°C** … 95°C	This value controls the temperature of the ACPI Active High Trip Point - the point in which the OS will turn the processor fan on Active Trip Point High Fan Speed.
Passive Trip Point	Disabled 15°C … **95°C** … 119°C	This value controls the temperature of the ACPI Passive Trip Point - the point in which the OS will begin throttling the processor
Passive TC1 Value	1	This value sets the TC1 value for the ACPI Passive Cooling Formula. Range 1 - 16
Passive TC2 Value	5	This value sets the TC2 value for the ACPI Passive Cooling Formula. Range 1 - 16
Passive TSP Value	10	This item sets the TSP value for the ACPI Passive Cooling Formula. It represents in tenth of a second how often the OS will read the temperature when passive cooling is enabled. Range 2 - 32

➔ USB Configuration

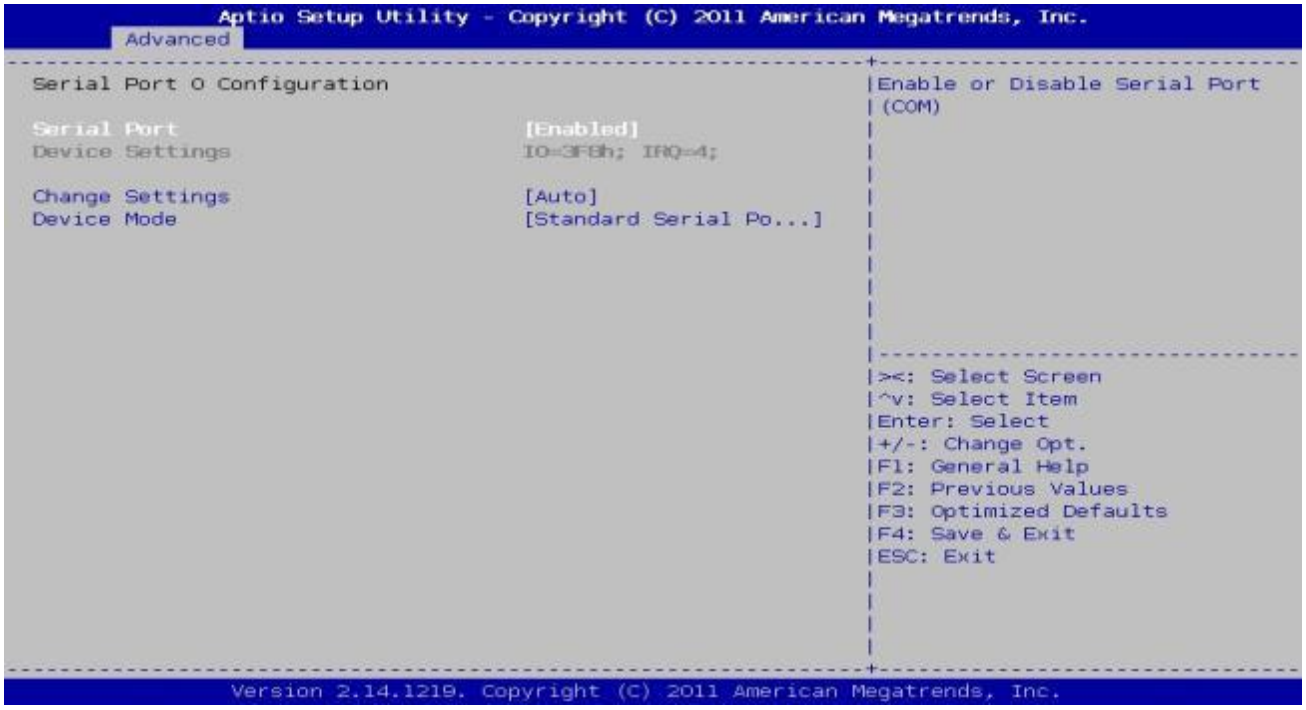


Feature	Option	Description
Legacy USB Support	**Enabled** Disabled	Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
EHCI Hand-off	Enabled **Disabled**	This is a workaround for OSes without EHCI hand-off Support. The EHCI ownership change should be claimed by EHCI driver
USB Beep	Enabled **Disabled**	Send speaker beep for device attach / detach
USB transfer time-out	1 sec 5 sec 10 sec **20 sec**	The time-out value for Control, Bulk and Interrupt transfers
Device reset time-out	10 sec **20 sec** 30 sec 40 sec	USB mass storage device Start Unit command time-out
Device power-up delay	**Auto** Manual	Maximum time the device will take before it properly reports itself to the Host controller. 'AUTO' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor

➔ Super IO Configuration

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Advanced
Super IO Configuration
Super IO Chip NCT6102D
> Serial Port 0 Configuration
> Serial Port 1 Configuration
Set Parameters of Serial Port 0 (COMA)
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

➔ Serial Port Configuration

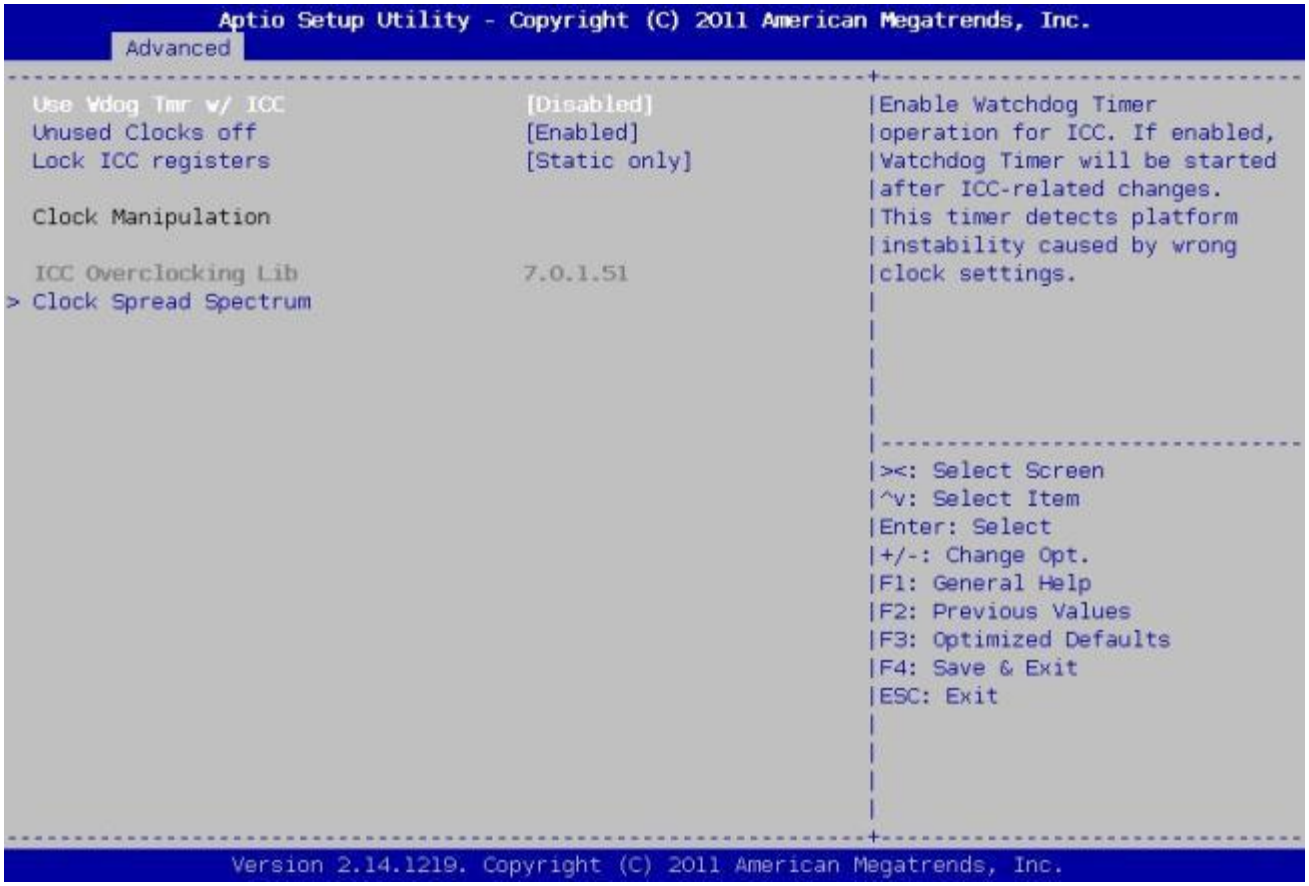


Feature	Option	Description
Serial port	Disabled **Enabled**	Enable or Disable Serial Port (COM) 1
Device Settings	**Auto** IO=3F8h; IRQ=4 IO=2F8h; IRQ=3	Select the IRQ and IO address for COM port
Device Mode	N/A	Select the com port mode

➔ Serial Port Console Redirection

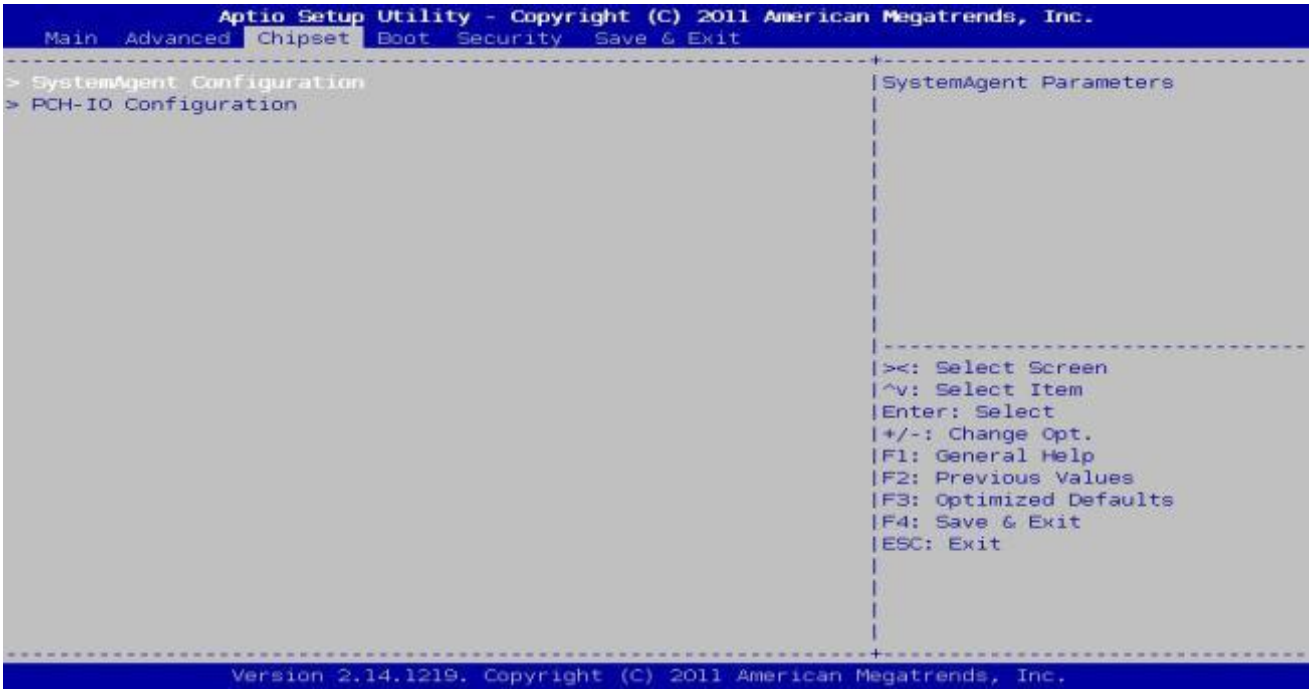
Feature	Option	Description
Console Redirection	**Disabled** Enabled	Enable/Disable Serial Port COM0 Console Redirection
Console Redirection	**Disabled** Enabled	Enable/Disable Serial Port COM1 Console Redirection

➔ Intel ICC


Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Advanced
Use Wdog Tmr w/ ICC [Disabled]
Unused Clocks off [Enabled]
Lock ICC registers [Static only]
Clock Manipulation
ICC Overclocking Lib 7.0.1.51
> Clock Spread Spectrum
Enable Watchdog Timer operation for ICC. If enabled, Watchdog Timer will be started after ICC-related changes. This timer detects platform instability caused by wrong clock settings.
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Feature	Option	Description
Use Wdog Tmr w/ICC	Enabled **Disabled**	Enable Watchdog Timer operation for ICC. If enabled, Watchdog Timer will be started after ICC-related changes. This timer detects platform instability caused by wrong clock settings
Unused Colocks off	**Enabled** Disabled	Disabled: all clocks turned on. Enabled: clocks for empty PCI/PCIe slots will be turned off to save power. Platform must be powered off for changes to take effect
Lock ICC registers	Static only	All registers: all ICC registers will be locked. Static only: only static ICC registers will be locked.
Colock Spread Spectrum	N/A	Change Clock SCC control

5.4 Chipset


Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
> SystemAgent Configuration
> PCH-IO Configuration
SystemAgent Parameters
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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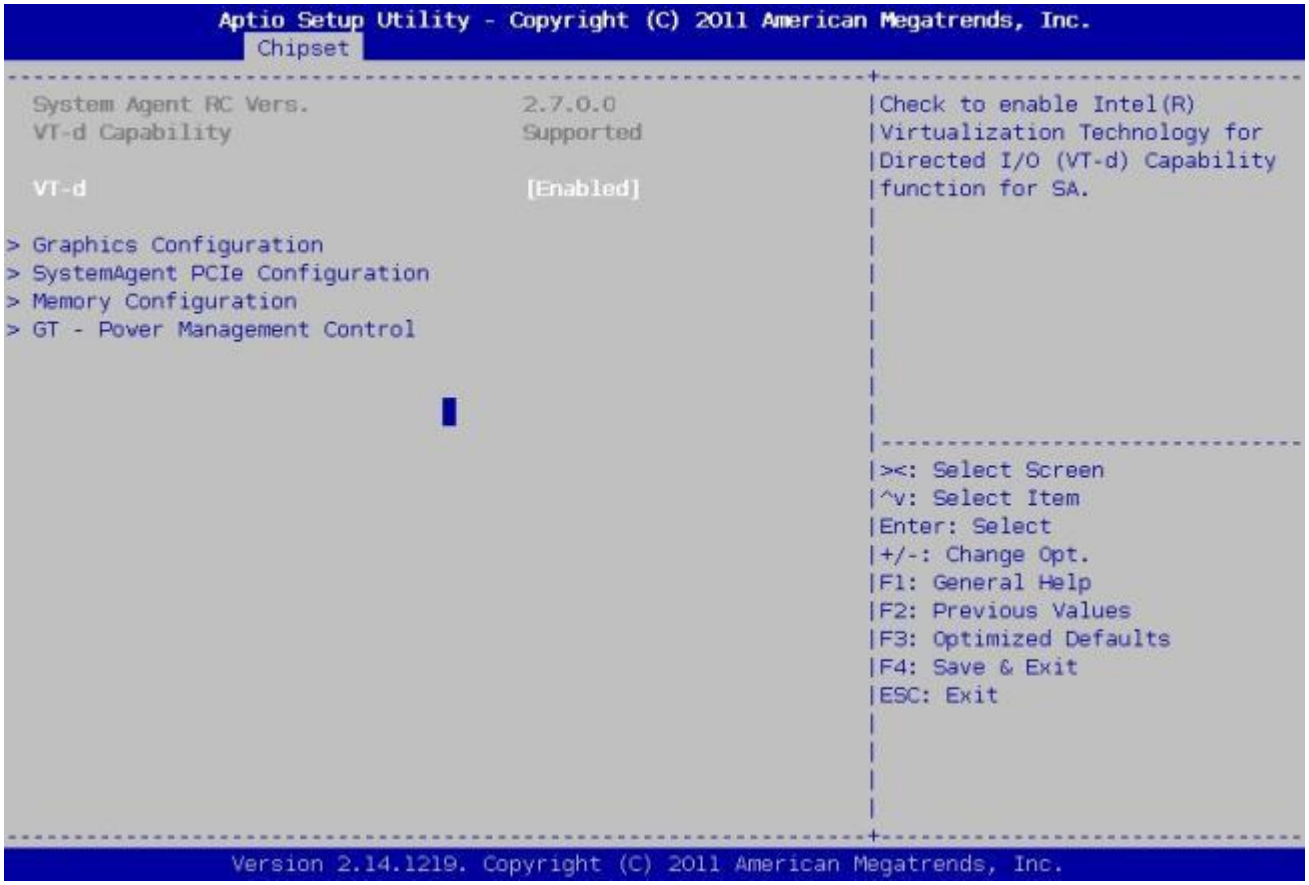
➔ System Agent Configuration


Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Chipset
System Agent RC Vers. 2.7.0.0
VT-d Capability Supported
VT-d [Enabled]
> Graphics Configuration
> SystemAgent PCIe Configuration
> Memory Configuration
> GT - Power Management Control
Check to enable Intel(R) Virtualization Technology for Directed I/O (VT-d) Capability function for SA.
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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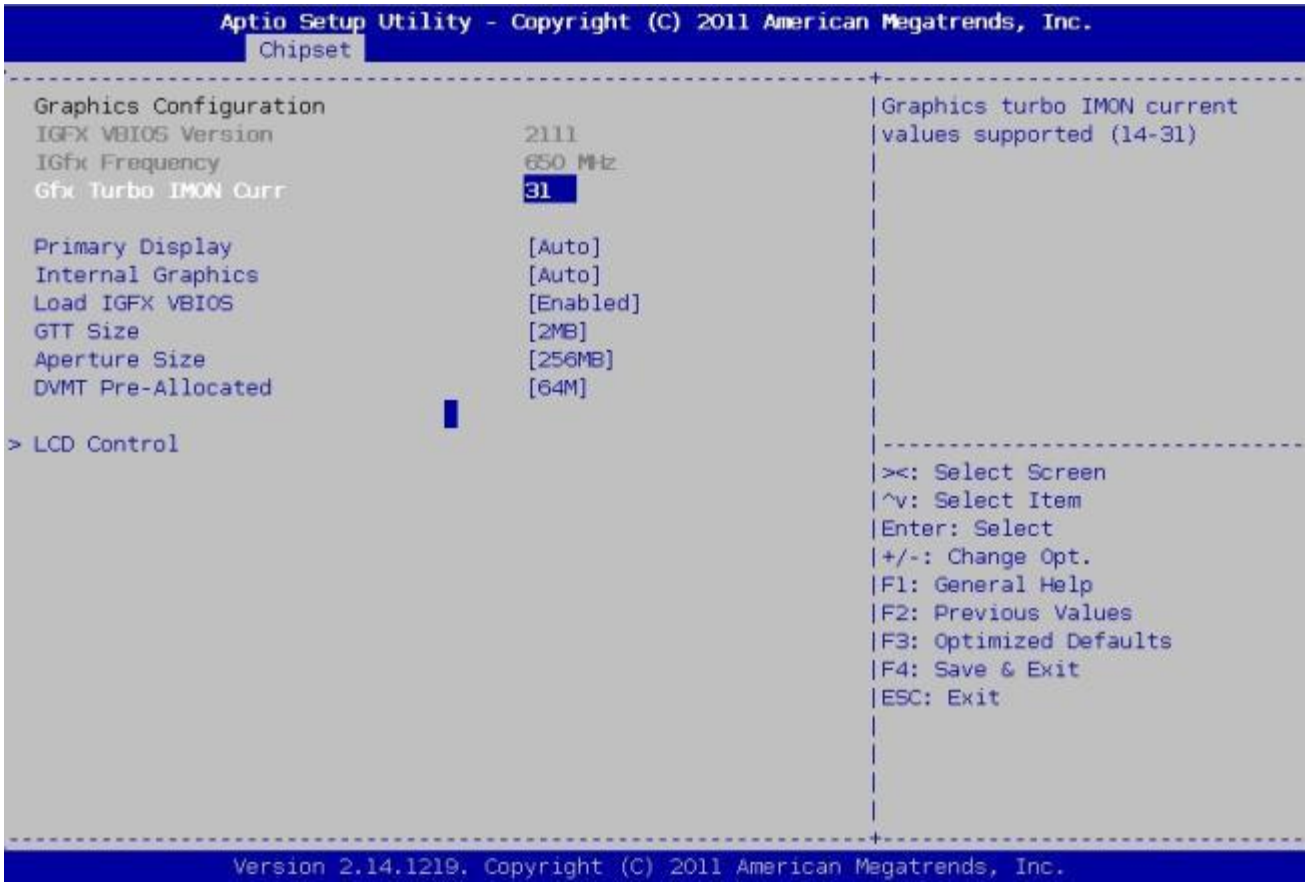
Feature	Option	Description
VT-d	**Enabled** Disabled	Enable/Dsiable Intel Virtual Technology(VT-d)

➔ Graphics Configuration



Feature	Option	Description
Primary Display	**Auto** IGD PEG PCI	Select which of IGFX/PEG/PCI Graphics device should be Primary Display
Internal Graphics	Auto Disabled Enabled	Keep IGFX enabled based on the setup options
Load IGFX VBIOS	**Enabled** Disabled	Enable/Disable load intel graphic video BIOS
GTT Size	1MB **2MB**	Select the GTT Size
Aperture Size	128MB **256MB**	Select the Aperture Size
DVMT Pre-Allocated	0MB **64MB** 512MB	Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics device

➔ LCD Control

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Chipset
LCD Control
Prim IGFX Boot Disp [AUTO]
Panel Color Depth [18 Bit]
Backlight Control [I2C]
Backlight Value 128
SDVO Device [Disabled]
Select the Integrated Graphics Video Device which will be activated during POST. This has no effect if external graphics devices are present.
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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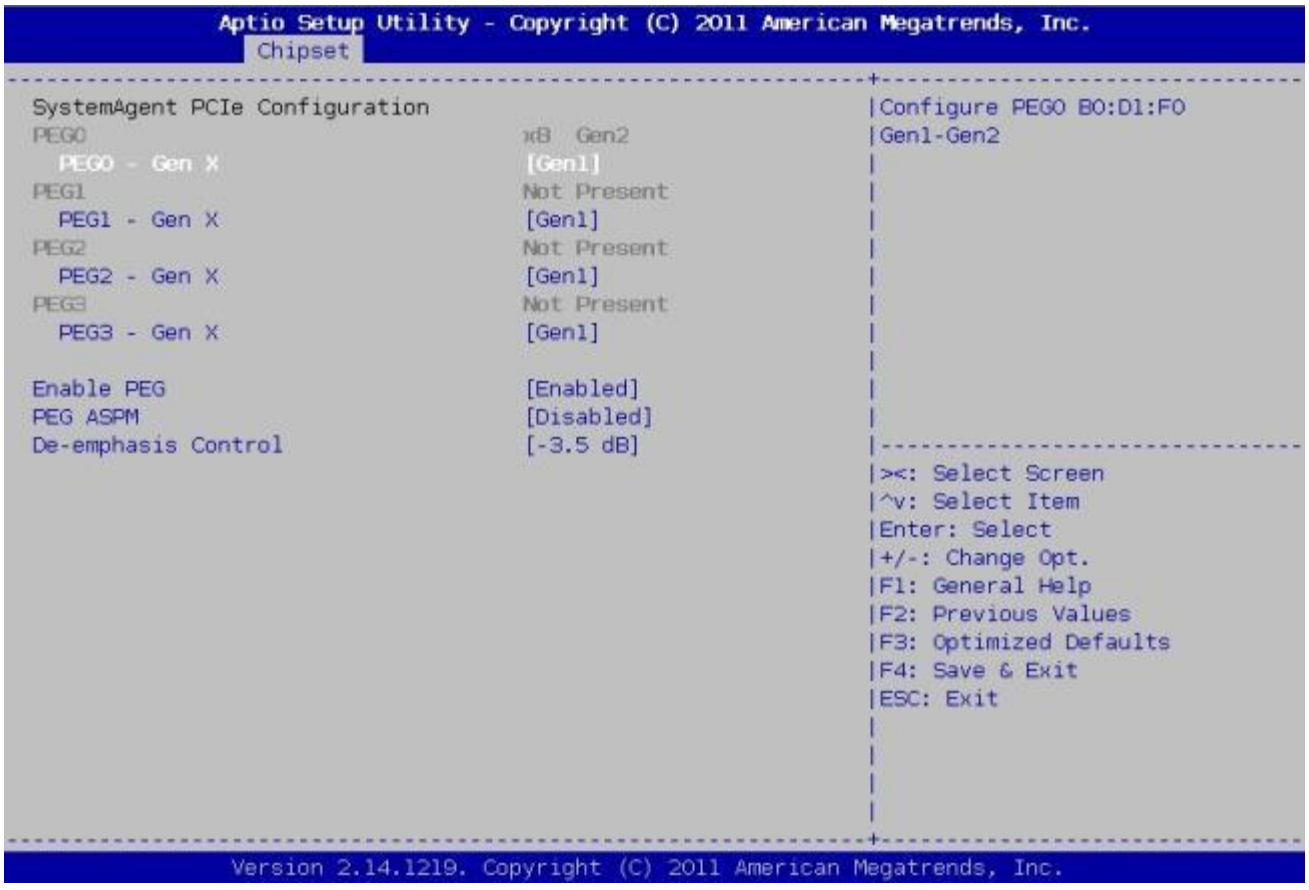
Feature	Option	Description
Prim IGFX Boot Disp	**Auto** CRT TV EFP LFP CRT2 TV2 EFP2 LFP2	Select the Integrated Graphics Video Device which will be activated during POST. This has no effect if external graphics devices arepresent
- Sec IGFX Boot Disp	**Disabled** CRT TV EFP LFP CRT2 TV2 EFP2 LFP2	Select Secondary Integrated Graphics Display Device
-Int. LVDS Panel Type	AUTO Pre-configured VGA 1×18 to WUXGA 2×24	Select LCD panel used by Internal Graphics Device by selecting the appropriate setup item

Panel Color Depth	**18 bit** 24 bit	For internal LVDS EDID detection, select the Panel Color Depth
Backlight Control	**I²C** PWM	Backlight Control Setting
Backlight Value	0~255 **128**	Set LCD backlight brightness (0-255)
SDVO Device	**Disabled** SDVO - DVI 1.0 SDVO - DVI-I SDVO - LVDS	Selects the DDI1 SDVO Device

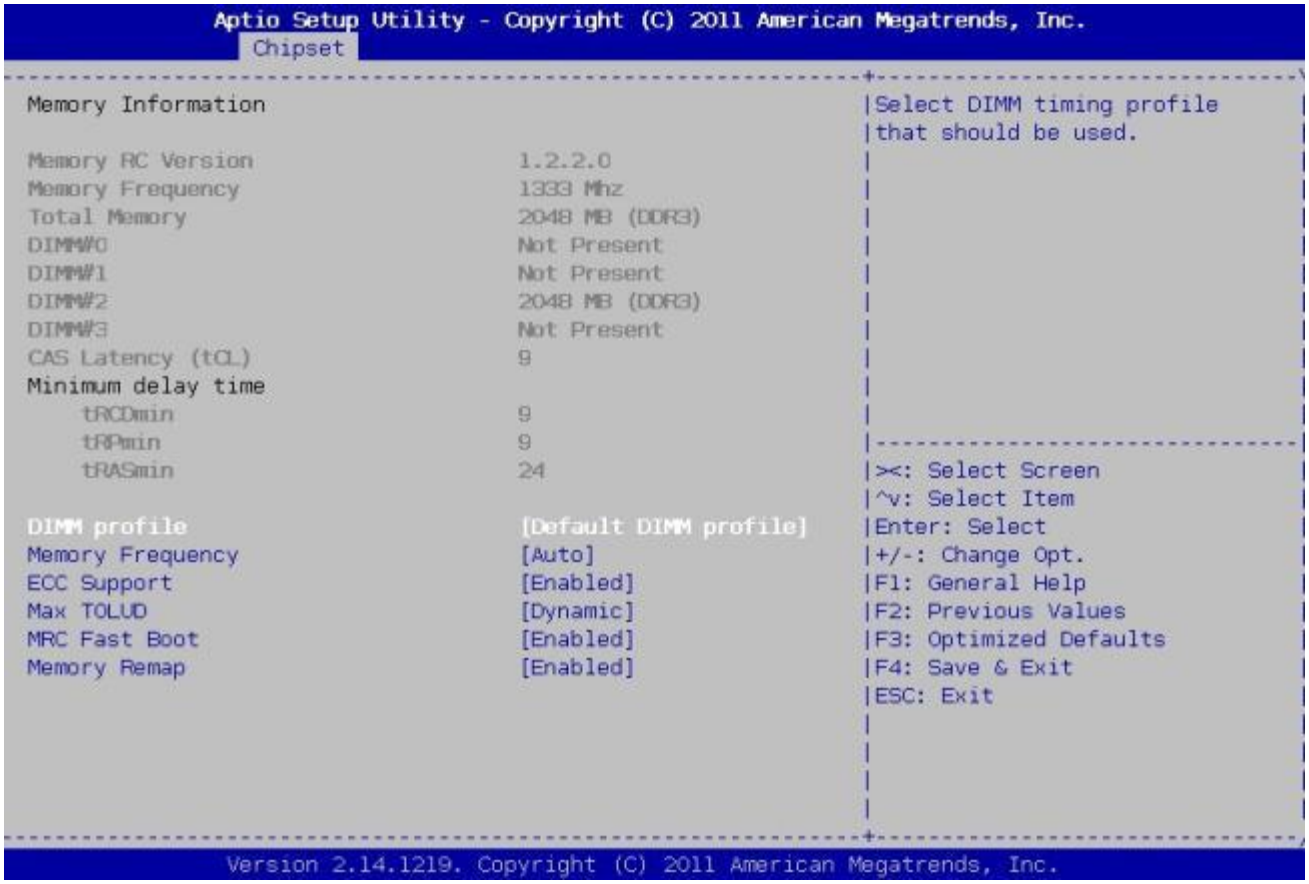
➔ System Agent PCIe Configuration



Feature	Option	Description
PEG0-Gen x	Auto **Gen1** Gen2	Configure PEG0 B0:D1:F0 Gen1-Gen2
PEG1-Gen x	Auto **Gen1** Gen2	Configure PEG1 B0:D1:F1 Gen1-Gen2
PEG2-Gen x	Auto **Gen1** Gen2	Configure PEG2 B0:D1:F2 Gen1-Gen2

PEG3-Gen x	Auto **Gen1** Gen2	Configure PEG3 B0:D6:F0 Gen1-Gen2
Enable PEG	**Enabled** Disabled	Enable the PEG slot. If available, the option 'HW Select' checks the PEG_Enable# signal
PEG ASPM	Enabled **Disabled**	Control ASPM support for the PEG Device. This has no effect if PEG is not the currently active device
De-emphasis Control	**-3.5 dB** -6 dB	Configure the De-emphasis control on PEG

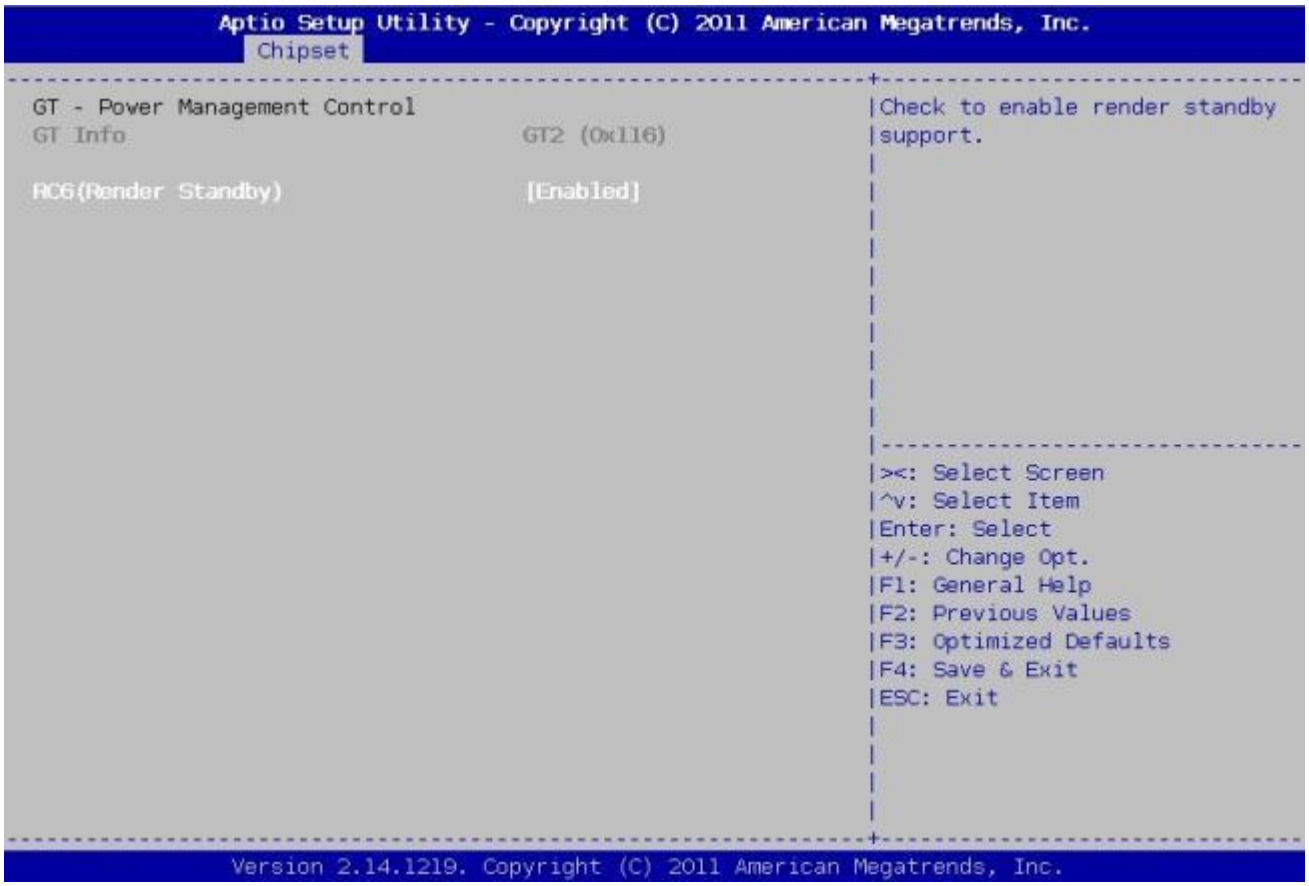
➔ Memory Configuration



Feature	Option	Description
DIMM Profile	Default DIMM Profile	Select the memory profiles
Memory Frequency	**Auto** 1600MHz 1333MHz 1066Mhz	Maximum Memory Frequency Selections in MHz
ECC Support	**Enabled** Disabled	Enable/disable Error Checksum Correction.
Max TOLUD	Dynamic 1 - 3.5GB	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed

		graphic controller. Manual TOLUD setting from 1GB to 3.5GB in 0.25GB steps
MRC Fast Boot	**Enabled** Disabled	Enable/Disable MRC FastBoot
Memory Remap	**Enabled** Disabled	Enable/Disable Memory Remap above 4GB

➔ GT-Power Management Control



Feature	Option	Description
RC6 (Render Standby)	**Enabled** Disabled	Enable or disable Intel Graphic controller Render Standby function.

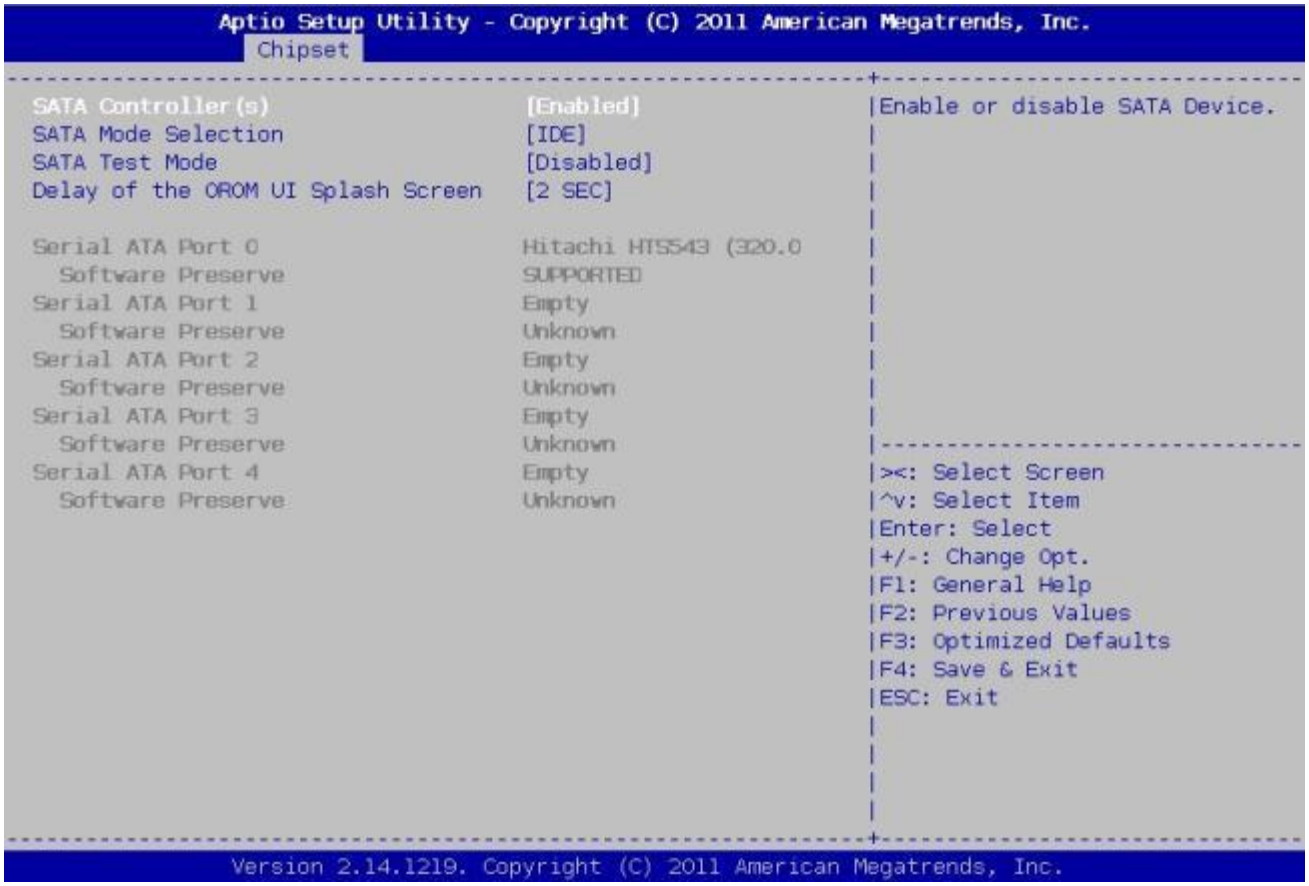
➔ PCH-IO Configuration

Feature	Option	Description
Launch Storage opROM	**Enabled** Disabled	Enable/Disable Storage Option ROM execution for boot
CLKRUN# Logic	**Enabled** Disabled	Enable the CLKRUN# logic to stop the PCI clocks
High Precision Timer	**Enabled** Disabled	Enable or Disable the High Precision Event Timer
Restore AC Power Loss	**Power On** Power Off Last State	Specify what state to go to when power is re-applied after a power failure (G3 State)

➔ LAN Configuration

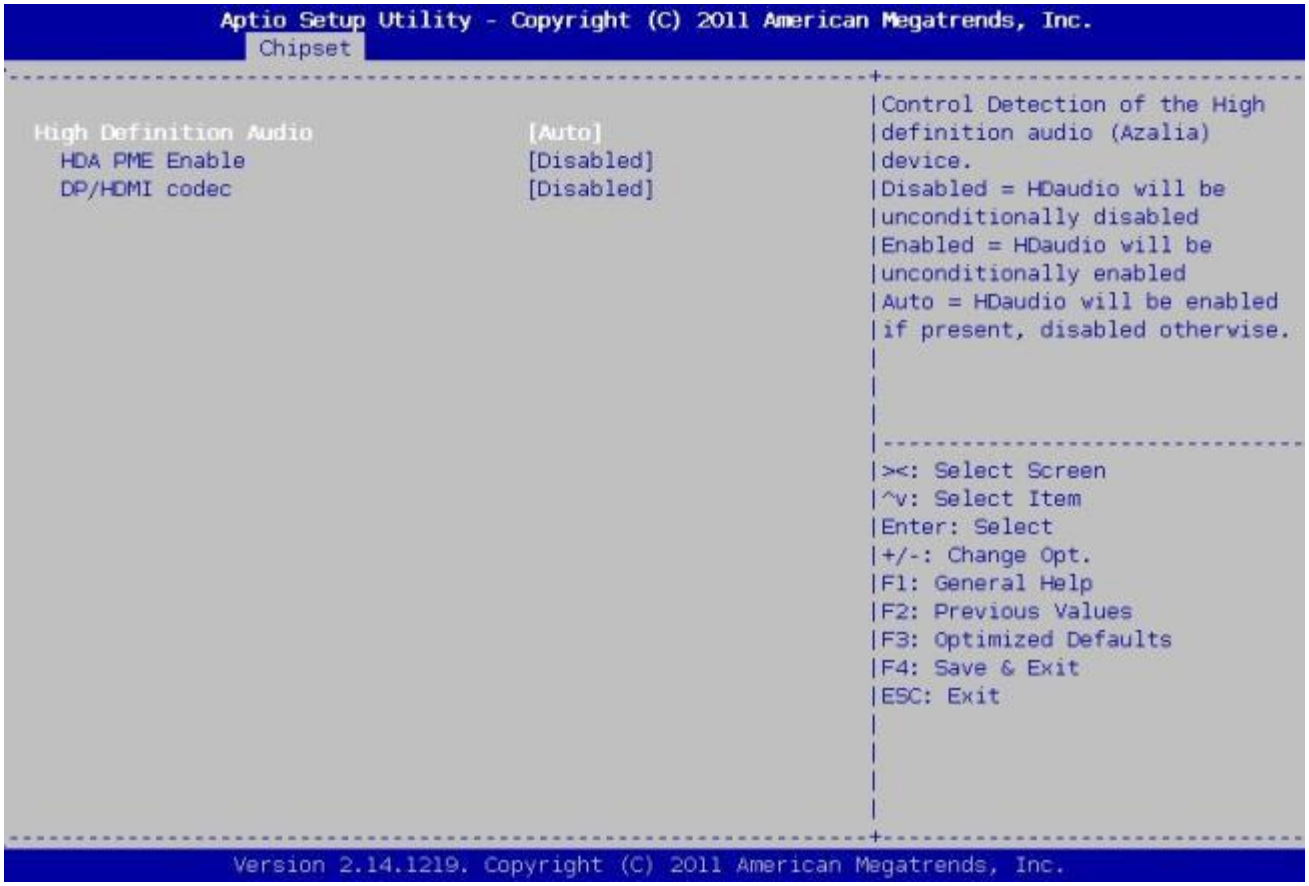
Feature	Option	Description
PCH LAN Controller	Enabled **Disabled**	Enable/Disable onboard NIC
Launch PXE opROM	Enabled **Disabled**	Enable/Disable PXE Option ROM execution for onboard LAN
Wake on LAN	Enabled **Disabled**	Enable/Disable integrated LAN to wake the system

➔ SATA Configuration


Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Chipset
SATA Controller(s) [Enabled]
SATA Mode Selection [IDE]
SATA Test Mode [Disabled]
Delay of the OROM UI Splash Screen [2 SEC]
Serial ATA Port 0 Hitachi HTS543 (320.0
Software Preserve SUPPORTED
Serial ATA Port 1 Empty
Software Preserve Unknown
Serial ATA Port 2 Empty
Software Preserve Unknown
Serial ATA Port 3 Empty
Software Preserve Unknown
Serial ATA Port 4 Empty
Software Preserve Unknown
Enable or disable SATA Device.
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Feature	Option	Description
SATA Controller(s)	**Enabled** Disabled	Enable/Disable SATA Device
SATA Mode Selection	**IDE** AHCI RAID	Determines how SATA controller(s) operate
SATE Test Mode	Enabled **Disabled**	Enable/Disable SATA Test Mode
Delay of the OROM UI Splash Screen	2 SEC	Change the delay time druing option rom UI splash

➔ HD Audio Configuration

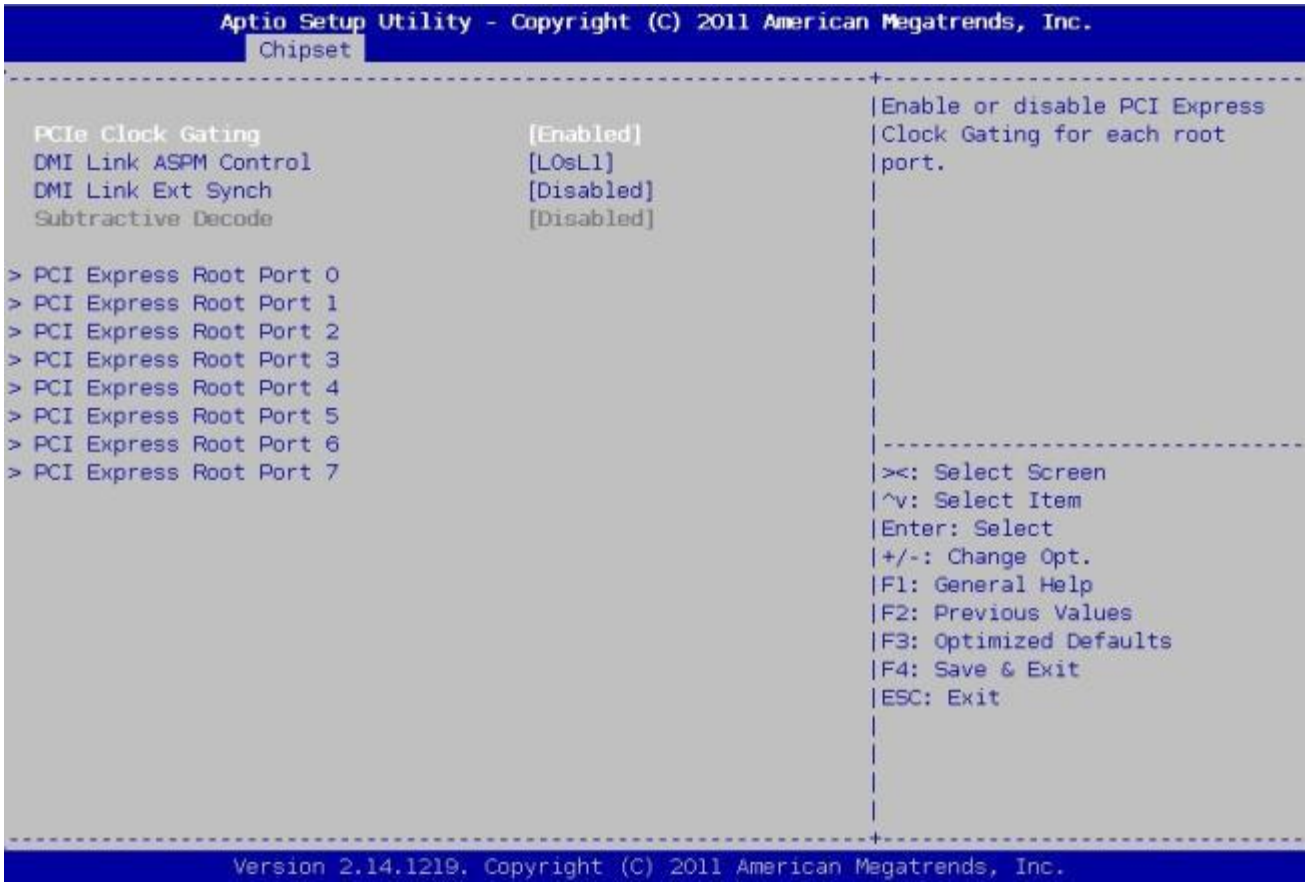

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Chipset
High Definition Audio [Auto]
HDA PME Enable [Disabled]
DP/HDMI codec [Disabled]
Control Detection of the High definition audio (Azalia) device.
Disabled = HDaudio will be unconditionally disabled
Enabled = HDaudio will be unconditionally enabled
Auto = HDaudio will be enabled if present, disabled otherwise.
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Feature	Option	Description
High Definition Audio	**Auto** Enabled Disabled	Control Detection of the High definition audio (Azalia) device. Disabled – HD Audio will be unconditionally disabled. Enabled - HD Audio will be unconditionally enabled. Auto = HDaudio will be enabled if present, disabled otherwise
HAD PME Enable	Enabled **Disabled**	Enable/Disable Power Management capability of Audio Controller
DP/HDMI Codec	Enabled **Disabled**	Enable/Disable internal DisplayPort/HDMI audio codec

➔ USB Configuration

Feature	Option	Description
EHCI1	**Enabled** Disabled	Enable/Disable EHCI controller #1
EHCI2	**Enabled** Disabled	Enable/Disable EHCI controller #2
USB Per-port Control	Enabled **Disabled**	Enable/Disable USB per-port control setup

➔ PCI Express Configuration


Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Chipset
PCIe Clock Gating [Enabled]
DMI Link ASPM Control [L0sL1]
DMI Link Ext Synch [Disabled]
Subtractive Decode [Disabled]
> PCI Express Root Port 0
> PCI Express Root Port 1
> PCI Express Root Port 2
> PCI Express Root Port 3
> PCI Express Root Port 4
> PCI Express Root Port 5
> PCI Express Root Port 6
> PCI Express Root Port 7
Enable or disable PCI Express Clock Gating for each root port.
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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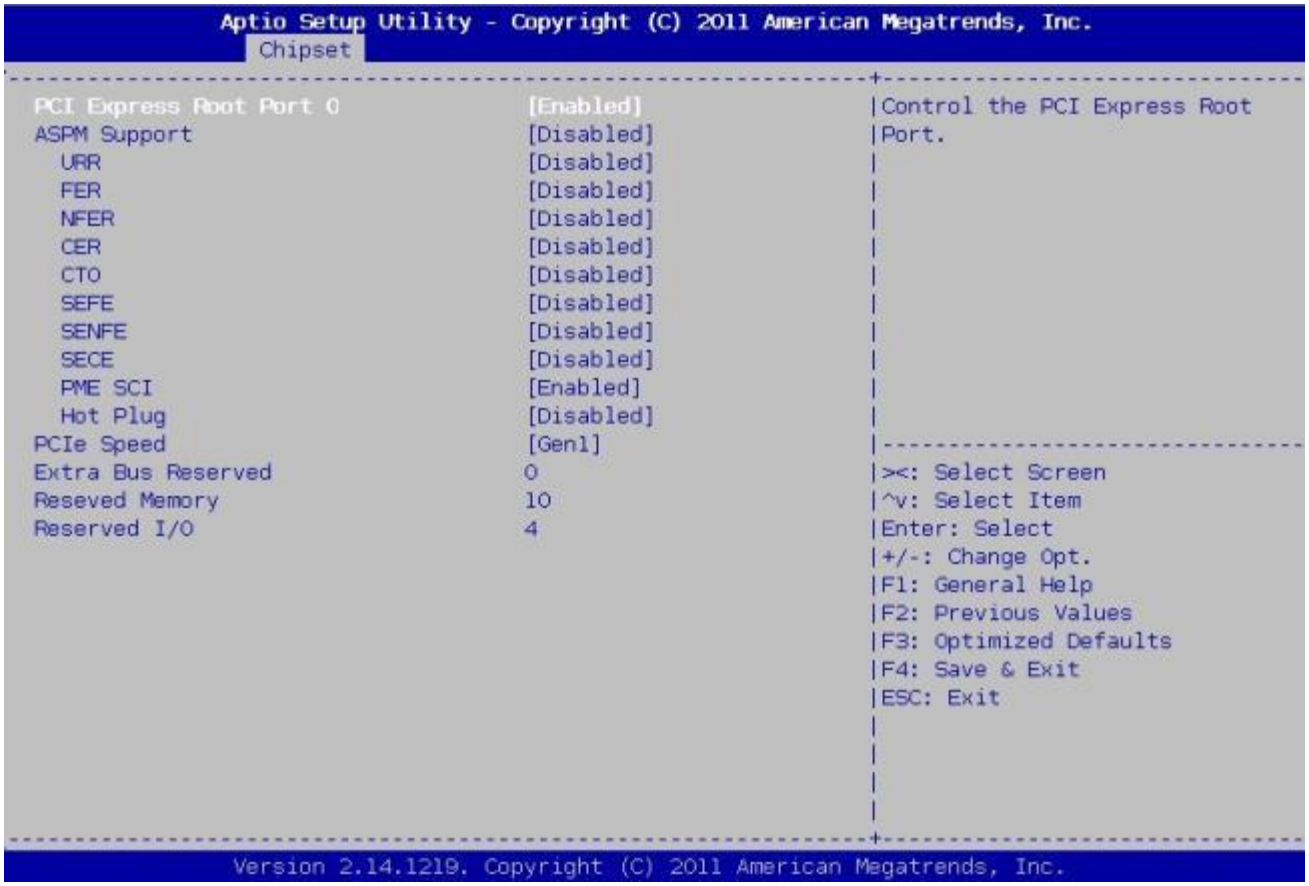
Feature	Option	Description
PCIe Clock Gating	**Enabled** Disabled	Enable/Disable PCI express clock gating
DMI Link ASPM Control	Disabled **L0sL1** L0s L1	Controls Active State Power Management on both NB side and SB side of the DMI Link
DMI Link Ext Synch	Enabled **Disabled**	Controls Extended Synch on SB side of the DMI Link
Subtractive Decode	**Disabled** Enabled	Enable / Disable PCIE root port subtractive decode

➔ PCI Express Root Port Configuration



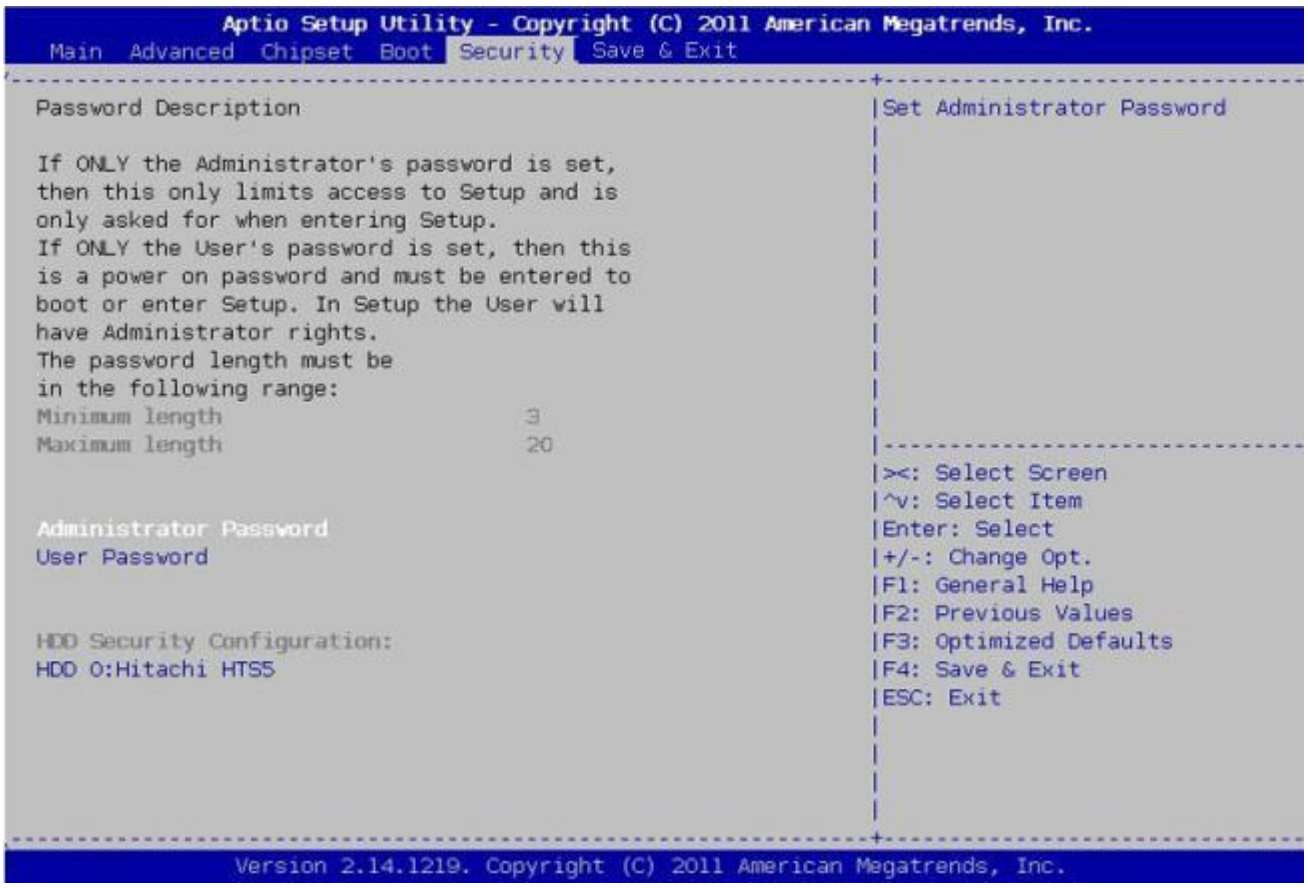
Feature	Option	Description
PCI Express Root Port 0	**Enabled** Disabled	Control the PCI Express Root Port
ASPM Support	**Disabled** L0s L1&L0s	PCIe ASPM setting. Enable this option will save power when PCIe device is idle
PME SCI	**Enabled** Disabled	Enable or Disable PCI Express PME SCI
Hot Plug	Enabled **Disabled**	Enable or Disable PCI Express Hot Plug
PCIe Speed	Auto **Gen1** Gen2	Configure PCIe Speed
Extra Bus Reserved	**0**	Extra Bus Reserved (0-7) for bridges behind this Root Bridge
Reserved Memory	**10**	Reserved Memory and Prefetchable Memory (1-20 MB) Range for this Root Bridge
Reserved I/O	**4**	Reserved I/O (4k/8k(12k/16k/20k) Range for this Root Bridge

5.5 Boot

Feature	Option	Description
Quiet Boot	**Disabled** Enabled	This function is used to display either POST output messages or a splash screen during boot-up
Fast Boot	**Disabled** Enabled	No
UEFI Boot	**Disabled** Enabled	This function is used to enable or disable uEFI boot from disks,when disabled, prevent the system from booting native uEFI-aware operating systems from disks,when set to enabled, to enable booting of native uEFI-aware operating systems from disks, if present, and in boot order
Setup Prompt Timeout	1~65535	This integer function is used to set an additional time the POST should wait for the operator to press the key to enter setup. The time is entered in seconds.
Bootup Numlock State	Disabled **Enabled**	This function is used to set the state of the keyboard's numlock function after POST.
GateA20 Active	**Upon Reset** Always	This function is used to enable or disable GateA20 Set to Upon Request to disable GateA20 in the uEFI BIOS. Set to Always to prevent the system from disabling GateA20

Option ROM Messages	**Force BIOS** Keep Current	This function is used to control the messages of the loaded PCI option ROMs Set Force BIOS to force to a BIOS-compatible output. This will show the option ROM message Set Keep Current to keep the current video mode. This will suppress option ROM messages. Option ROMs requiring interactive inputs may not work properly in this mode.
Interrupt 19 Capture	**Disabled** Enabled	This function is used to specify if legacy PCI option ROMs are allowed to capture software in-terrupt 19h. Set to Disabled to prevent legacy PCI option ROMs from capturing software interrupt 19h. Set to Enabled to allow legacy PCI option ROMs from capturing software interrupt 19h.
Boot Option #1	**Built-in EFI Shell**	These functions are used to form the boot order and are dynamically generated. They represent either a legacy BBS (BIOS Boot Specification) class of devices or a native EFI boot entry. Press Return on each option to select the BBS class / EFI boot entry desired.
Boot Option #2	**Disabled**	
Hard Drive BBS Priorities		These functions lead to sub-menus that allow configuring the boot order for a specific device class. These options are visible only if at least one device for this class is present. These functions are dynamically generated.

5.6 Security


Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Password Description
If ONLY the Administrator's password is set,
then this only limits access to Setup and is
only asked for when entering Setup.
If ONLY the User's password is set, then this
is a power on password and must be entered to
boot or enter Setup. In Setup the User will
have Administrator rights.
The password length must be
in the following range:
Minimum length 3
Maximum length 20
Administrator Password
User Password
HDD Security Configuration:
HDD 0:Hitachi HTS5
Set Administrator Password
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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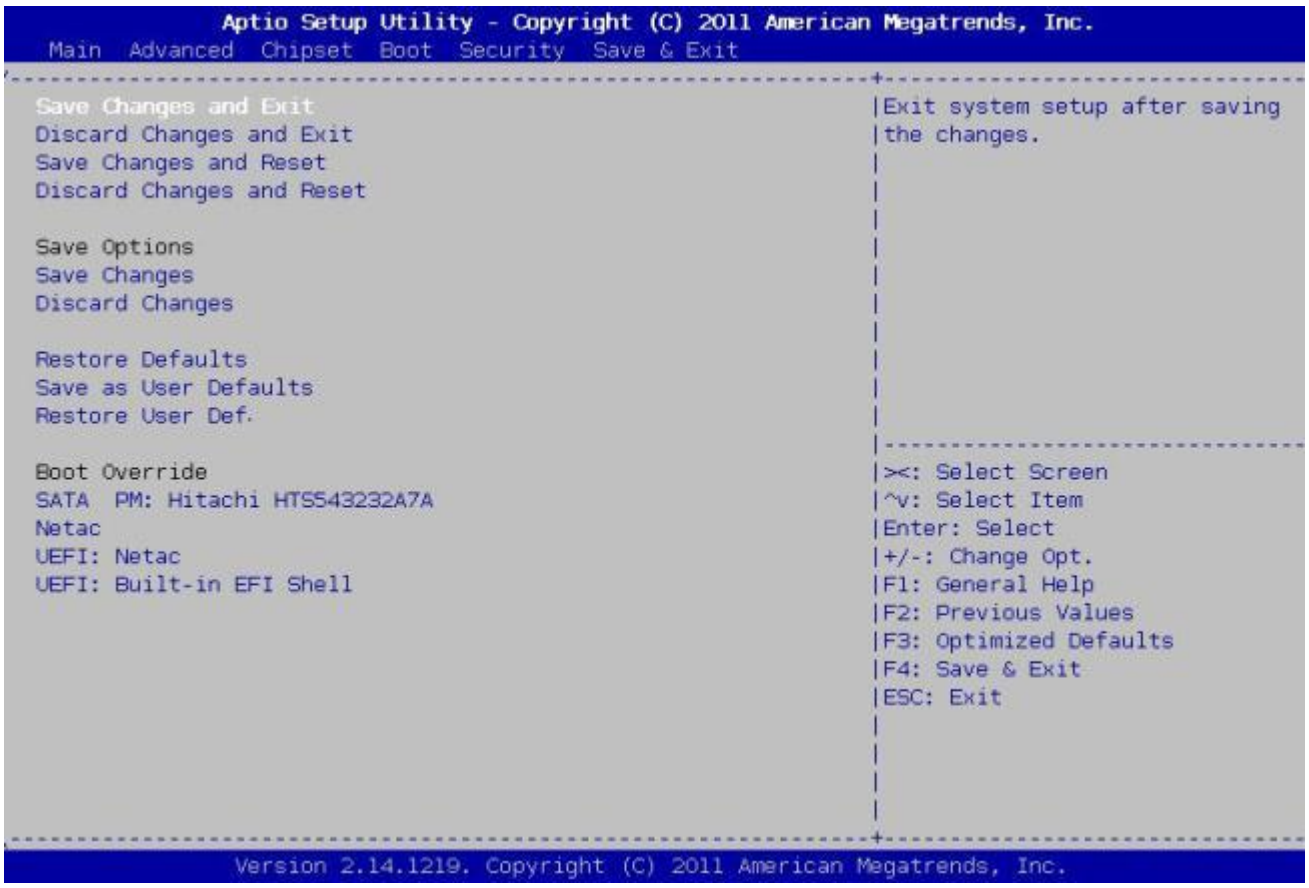
Feature	Options	Description
Setup Administrator Password	N/A	This function is used to set, change or delete the Administrator password. If there is already a password installed, the system asks for this first. To clear a password, simply enter nothing and acknowledge by pressing Return. To set a password, enter it twice and acknowledge by pressing Return. Note: The password is case-sensitive.
User Password	N/A	This function is used to set, change or delete the User password. If there is already a password installed, the system asks for this first. To clear a password, simply enter nothing and acknowledge by pressing Return. To set a password, enter it twice and acknowledge by pressing Re-turn. Note: The password is case-sensitive.
HDD Security Configration	N/A	Set HDD Password when HDD support security feature.

5.7 Save & Exit



Feature	Option	Description
Save Changes and Exit	N/A	This function is used to save all changes made within the Setup to flash. This function continues the boot process as long as no option was altered that requires a reboot.
Discard Changes and Exit	N/A	This function is used to discard all changes made within the Setup. This function continues the boot process.
Save Changes and Reset	N/A	This function is used to save all changes made within the Setup to flash. This function performs a reboot afterwards.
Discard Changes and Reset	N/A	This function is used to discard all changes made within the Setup. This function performs a reboot afterwards.
Save Changes	N/A	This function is used to save all changes made within the Setup to flash. This function returns to Setup.
Discard Changes	N/A	This function is used to discard all changes made within the Setup. This function returns to Setup.
Restore Defaults	N/A	This function is used to restore all tokens to factory default
Save as User Defaults	N/A	This function is used to save all current settings as user default. The current setup state can later be restored using Restore User Defaults.
Restore User Defaults	N/A	This function is used to restore all tokens to settings previously stored by Save as User Defaults.

Boot Override	N/A	This group of functions includes a list of tokens, each of them corresponding to one device within the boot order. Select a drive to immediately boot that device regardless of the current boot order. If booting to EFI Shell this way, an exit from the shell returns to Setup.